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LELAND-STANFORD JUNIOR-UNIVERSITY

PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND
MONTHLY RECORD OF GEOGRAPHY.



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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Lake Tanganyika.

By EDW. COODE HORE, Master Mariner.

(Read at the Evening Meeting, November 28th, 1881.)

Maps, p. 64.

IN March 1877 I was appointed to the London Missionary Society's pioneer expedition in Central Africa; to myself was committed more especially the care of such scientific observations as could be carried out amidst our various duties, the survey of the lake, and the marine department of the Mission. To aid me in this work, I was introduced by the late Dr. Mullens to your Society, and received from the late Commander George such information as enabled me to use with effect the meteorological instruments with which we were provided, and especially a most careful instruction in the use of the hypsometrical apparatus, by aid of which I have been able to produce a section of the country in addition to my map of the route. I have presented to the Society a two years' series of meteorological observations made at Ujiji, and a three months' series made at Kirasa's, in the Mukondokwa valley. Mercurial barometers have also since been set up at Urambo and at Uguha.

Road to the Lake.—The road we were to take, though parallel to some extent with what might be called the old road used by Cameron and Stanley, was in fact almost entirely new. The portions from Saadani to Mpwapwa, avoiding the Makata swamp, were taken on the recommendation of Mr. Roger Price, who had made a preliminary journey so far; and the portion leading through the territory of the chief Mirambo was determined on with the twofold purpose of avoiding the Arab settlement of Unyanyembe, and of opening friendly negotiations with Mirambo.

More than this, we were to introduce a new (for Central Africa, at least) system of transport—bullock waggons.

Landing at Saadani in June, we at once commenced training bullocks for this service, and at the latter end of July we really started for the interior with our bullock train. Succeeding eventually in

reaching Kirasa, the bullock transport came to an end by the death of these animals by the tsetse fly. Every other difficulty had been overcome for 150 miles of the most difficult part of the road, and only in respect of the fatal tsetse can this experiment be called a failure. Returning eventually to the ordinary modes of transport by porters, the remaining part of the journey, namely from Mpwapwa to Ujiji, was accomplished in 87 days, a journey which, considering the amount of goods carried and the new experience to be bought, has not yet been surpassed. We arrived at Ujiji on the 23rd August, 1878.

I think there has been much misapprehension in England with regard to this old road. At one of your meetings in December last year it was stated, in comparing it with another road, that a caravan journey from Zanzibar to Ujiji occupied six months, and that the rate for transport of goods was about 400*l.* per ton; whereas the fact was, our first real caravan journey was accomplished in 116 days, or less than four months, the second in 99 days, and I have myself walked over the same road in 62 consecutive or 50 marching days. The 400*l.* per ton represented not mere transport, but most exceptional loss.

Again, in the *Times* of the 27th of March 1879 it was stated that, with the assistance of steam power on Lake Nyassa and the river Zambesi, the journey from Lake Tanganyika to Quilimane might be accomplished in 45 days, and to London in 75 days, and the writer was apparently ignorant of the fact that, nearly a year before, the first party we despatched from Ujiji by the old road reached the coast in 45 days, the letters reaching London in 78 days. Of this route I have made a map and section. The latitudes of various points have been fixed by meridian observations of stars north and south. On my recent journey to the coast I measured the road distance of each day's journey by means of a perambulator which I constructed at Ujiji.

The moist and luxuriant coast region, the scrubby plains and harsh thorny jungles of eastern and western Ugogo, with the beautiful forest dividing them, the step on to the forest plateau of Uyansi and Unyamwesi, the growing luxuriance of the Tanganyika watershed, I cannot here describe; I hope to do so some day, together with the surprising advances to be observed in the arts and industries and in social order amongst the natives as we proceed further inland.

General Description of the Lake.—Lake Tanganyika is 330 miles in length, with a coast-line of 900 miles, and its depth is hitherto unfathomed. A survey spreading over such distances, although of two years' continuance, must necessarily be but a rough one.

Various theories have been suggested to account for the disposal of the vast quantities of water which drain into the Tanganyika, such as enormous evaporation, subterranean outlet, &c., &c. What I have to remark on this point embraces no theory, but is a simple account of observations made during my residence upon the lake shores. I found the

lake to be 2700 feet above the sea-level, and at the time of our arrival Arabs and natives alike agreed in informing me that its waters were slowly but surely rising, and had been doing so for some length of time. But a close observation on my part failed to ascertain any rise, and desiring to obtain accurate information on the subject, I erected, in March 1879, a water gauge on the shores at Ujiji. By the 27th of May I found that the waters had fallen 2 feet, and they continued to fall until, in August 1880, they reached a point 10 feet $4\frac{1}{2}$ inches below my original watermark. Most evident signs of the receding of the waters might be seen all round the shores of the lake, in belts of dead timber and bleached rock. The Arabs were agreed that, shortly before our arrival, the Lukuga obstruction was broken away, and I am inclined to believe from these reports, and from personal observation, that the lake had been rising gradually for a long term of years, until the force of water carried away that obstruction, and the Lukuga river became the veritable outlet of the lake. That the evaporation was sufficient in some years to maintain the lake at a level is very likely the case, but the loss from this cause would be overcome in heavy rainy seasons by the larger accumulation of incoming waters, and the lake would increase. The rainy seasons are extremely different in different years; hence a few successive wet years would cause an unusual rising of the lake waters, such as seemed to have occurred just before our arrival. I am convinced that the lake never, or at any rate for very many years, was at such a height as just before that time. But this is quite apart from any geological evidence of the different state of things in remote ages.

I have been understood to connect the changes of the water level of Tanganyika with earthquake movements. This I did not intend to do, but merely to admit the possibility of such a theory, and the probability that the bed of the lake is in reality a vast chasm caused by volcanic or earthquake movement, by calling attention to the fact that such movement is not uncommon even now.

Some twenty years ago, the Arabs informed me that an extraordinary disturbance of the lake waters occurred, a long line of broken water being seen bubbling and reeking with steam. The next morning all was tranquil, but the shore was strewn with fragments of a substance resembling bitumen, a specimen of which I have deposited with your Society. The first severe shock of earthquake I felt myself at Ujiji was at 9 p.m. on the 10th of August, 1880, which shook the house considerably. There had been two or three slight shocks at the same time in the previous year, but on this occasion the succeeding vibrations lasted for two or three months longer at intervals. There seemed to be a line of vibration through N.N.W. to S.S.E., and I observed a crack in the earth right through the town of Ujiji, extending for two or three miles in broken intervals in this direction. Captain Carter, of the Belgian expedition, also noticed a shock of earthquake at about this period

in Southern Unyamwesi, and Mr. Thomson, of the Royal Geographical Society's expedition, reports a shock at Kapufi's, on the Lofu river, on April 12th, about 4 p.m.

Although of such large extent, and of such variety of aspect, there is a general sameness in the Tanganyika scenery; the whole basin forms in fact a vast chasm enclosed within mountain ranges or cliffs, terminating in elevated plateaux, a few lower lands intervening, natural gaps in the ranges, banks and deltas formed by eroding torrents, and in a few localities, such as at Ujiji and elsewhere, a strip of shelving beach in an east and west direction breaks the general north and south line of the lake. North of Ujiji the surrounding mountains approach the lake shore with but a small interval of low undulating hills, and have the appearance of meeting some distance north of the lake, as described by Captain Speke.

The extreme north end, however, is low alluvial land, with banks of reed and papyrus; following the general rule on the lake, which is, that bordering a shore trending east and west, an expanse of shallow water and a low beach are usually found, as though the shore had been washed down gradually by the waves. In some places, however, this is a bringing down and depositing of matters by rivers. The peninsula of Ubwari is simply a long ridge ascending steeply from the lake on all sides.

I found the southern half of the Burton Gulf to be very shallow, obtaining, on sounding, only four or five fathoms of water right across it.

The isthmus of Ukaramba is formed of low hills, and behind Ubwari there is a considerable expanse of lower land between the lake and the mountains, which again approach the shore at Goma. The lofty and level horizon of the Goma hills is one of the sights of the lake. About half the year it is visible from Ujiji, on a clear day, though 40 miles distant, and the streams, descending to the lake down these lofty hill-sides, may be plainly seen like silver threads. The paths to the villages, which are placed on the ridges and peaks of these hills, are in some places mere flights of steps. Though molested by several of the lake tribes, the Wagoma are a spirited and industrious race, and have grand resources further inland in a rich ivory country, of which little is yet known.

The country of Uguha, with its bay of islands, its Lukuga, and its Plymouth Rock Mission Station, forms a decided gap in the rim of the lake basin; as such it has formed hitherto the natural gateway to the regions beyond, for those who have penetrated these regions, and as such is a position of much importance both to missionaries and travellers.

Moving south along this west coast, the mountains approach the lake again gradually till the aspect of the steep shores of Goma is repeated in the rich and populous districts of Marungu and Itawa. Another gap at

the Cameron bays, and we approach the loftiest barriers of the lake at the south end.

From the Lofu river round by capes Kalambwe and Pambete to the district of Kituta, the glorious undercliff of the Isle of Wight is reproduced on a gigantic scale and with tropical vegetation. The airy but still luxuriant downs above afford some splendid and healthy localities amongst which the London Missionary Society are about to select a site for another station, at a point which will be the Tanganyika terminus of Mr. Stevenson's road between the two lakes.

The entrance to the Lofu river is itself worthy of separate description. It is in the southern corner of the bay formed by the northern coast of Ulungu and the south-east corner of Itawa. With the wind east, or anywhere from east to north, there is a very nasty chop on a bar considerably outside of what would ordinarily be considered the actual mouth of the river. The embouchure itself is not visible until one comes close upon it; then, turning sharp round to the southward, a beautiful gap in the coast-line opens to view a broad and deep entrance. Where there are sheltered points in the river banks, there the long water-grass and papyrus accumulate in thick masses of very bright green, which are so fresh and flourishing and clear of débris as to add considerably to the beauty of the scene instead of the contrary, which is more generally the case on the lake shores. Steep verdant slopes rise up on every side, broken by gullies choked with dense vegetation, and conducting smaller streams into the general outlet.

There is no expanse of river to be seen here. Sailing into the entrance, one appears to be only running up into an inlet with large masses of water-grass at its head and hills beyond; but as we advance, the zigzag reaches of the river disclose in succession vista after vista, all of similar aspect, until, turning again westward, a vast gap or basin presents itself, forming one of the most beautiful sights I have yet beheld on Lake Tanganyika. A long winding lake, from which ascend, with more or less intervening lowlands, immense hills, with for the most part clear straight sky-lines, showing the edges of the table-lands above. On the southern side, a long and gentle rise from the water-edge to the steeper hillside is covered with villages and extensive gardens. Here one may walk for miles through field after field of waving corn and rice. Westward, the valley narrows towards the more confined space of the incoming waters, but the outlet, where we had now just arrived, is quite hidden at a short distance. The whole thing is on so extensive a scale that I could not on the spot realise the sense of confinement which the description may seem to indicate. But we were to be much disappointed; each zigzag hitherto had in due course permitted that progress which at first sight it seemed to deny; now, with the view all open and promising, we were brought to a stand behind a dense mass of floating vegetation, which proved to us quite impassable, and here we were com-

pelled to moor the boat. On a closer inspection of the barrier I was convinced that I could cut a channel for the entrance of a vessel in two or three days with a gang of ten or twelve men with tools: a channel which would be finally thoroughly cleared by the force of the water when it was once opened. The river now flows clear and deep beneath. During my second visit, a good-sized boat, belonging to a party of Wajiji, was dragged *over* the floating vegetation by main force. This I tried on my first visit, but had not men enough for any great effort.

The country of Fipa in continuation presents a lofty but less perpendicular front to the lake, the land being broken into tree-clothed hills and ridges, gradually rising to the great inland heights, an aspect continued as far as the plain of Musamwira. Then the Kawendi Mountains and the lofty peaks of Cape Kungwe frown upon the lake in sublime grandeur, broken only by immense and beautiful chimes, through which descend the watercourses from the heights, tumbling down in refreshing cascades and waterfalls. Further north, the mountains, more or less broken, again recede, leaving the eastern gap in the rim of the lake basin in which Ujiji is situated.

The map of the lake, which I have pleasure in submitting to the Society, is the result of my own survey based upon latitudes by meridian altitudes of stars north and south, and compass bearings with an error of compass allowed by my own observations of 11° west at Ujiji, increasing gradually to 14° west at the south end of the lake; most of the principal points giving the general outline being laid down from bearings by azimuth compass on shore, all the detail filled in by the boat's compass. The coast of Ulungu was surveyed with special care. The exceptions to a full survey of every bend in the coast at the south end are the portions from Pambete to the Lofu, and from Musi to Cape Kipimbwe.

The weather was frequently unfavourable for astronomical observations, but still many good latitudes were obtained. My boat's compass was a large one, fitted in a proper binnacle, and frequent comparison with a compass on shore proved it to be accurate. The names of various places were obtained by careful inquiry of natives on the spot. I had no Ujiji pilot with me to volunteer uncertain information. In the progress of my work I was unable to take extensive soundings, but I have frequently found no bottom with the 168 fathoms of line I carried with me.

Natives.—In describing the natives on the shores of Lake Tanganyika, I have to deal with ten distinct tribes, with their separate national peculiarities and customs, all of which I cannot here enter upon. That these tribes are what we commonly term savages I cannot deny, but I say that there are manifestations of civilisation amongst these people which we should do well to recognise. We see this especially in the advance they have made in the utilisation of the produce of their country. they work their own iron and copper extensively, producing a great

variety of weapons and articles both of utility and ornament. Salt is carefully prepared in the localities producing it, and distributed therefrom as an article of barter all over the lake. Palm oil is largely prepared in Ujiji and Urundi, and distributed in the same way; in localities producing china clay and other valuable materials, there are large pottery works. One of the islands of Uguha and a place in Uaira are famous in this respect. Rua and Manyema produce artistic iron work, and the famous grass or palm-fibre cloth. The dairy farms of Uhha send well-known packages of butter, and the poorer districts of the lake put up the parcels of dried fish which are sent far and wide throughout the country. This fishing industry is a very extensive one. The Warundi have small catamarans, made of four or five trunks of the pith-tree strung together, from which they angle for medium-sized fish. But the more extensive work goes on at night in little hollowed-out log canoes, upwards of 200 of which I have counted at one time; each canoe with its fire to attract the tiny fish, which are caught in large hand-nets. The seine is also used in some parts of the lake, and for the larger fish immense wicker traps are sunk to the bottom. Cotton cloth is also made at several places, and the various woods and barks are utilised largely for particular purposes—one kind for canoes, another for spear shafts, a third for mortars, a fourth for pestles, &c.

The division of labour thus indicated is evidence that amongst these tribes there is a wholesome system of co-operation, which is the beginning of better things. Still, amidst all this, they have been for years isolated from the outer world; and, remembering this, I consider the small advance they have thus made to be most remarkable. A comparison of these with the poor degraded people of the coast regions shows a wide difference. Most of these interior tribes, for instance, live in well-organised villages, in which considerable social order is maintained.

The Central African natives are in the iron age, and it is believed that no stone implements have been as yet discovered by any traveller. I have brought two pieces of stone, which it remains for those more skilled than myself in such matters to prove whether they are stone implements or not. They were given to me by Mr. Hutley, who describes them as being found from time to time by the natives, particularly in shallow parts of the lake, but sometimes on shore. They seem to be quite ignorant of the way in which they have been produced, but regard them with great reverence as representatives or messengers from their deceased ancestors, storing them carefully away in little huts or baskets, carefully secured from damage. The only use I can suggest for these stones is that of weights on sticks used in cultivation, as employed by the Hottentots, but the natives have no knowledge of their former use.

I have brought home specimens of arms, pottery, basket-work, cotton, bark, and palm-fibre cloths, as well as samples of the lake water, the water of the hot springs of Uguha, palm oil, mpufu oil, cotton, tobacco,

china clay, and the salt of Uvinsa and Ugogo, which may be seen at the London Missionary Society's museum.

Climate, Products.—The lake is subject to frequent storms, especially from south, south-east, and south-west, lasting sometimes for two or three days, and leaving a heavy swell, which proves a great hindrance to navigation. At the changes of monsoon, violent squalls from the north and north-west sweep over the lake, making canoe work dangerous, and raising at times a terrible cross sea. During this unsettled weather immense masses of rain-clouds hang about the hill-tops surrounding the lake; waterspouts are frequent at these times, and my boat was once completely turned over on the shore by a whirlwind which swept over Ujiji from the westward. After having been round the world two or three times, I have never witnessed such wondrous cloud scenery and majestic effects of thunder and lightning as on Tanganyika. But a small proportion of rain, however, is discharged upon the surface of the lake, the clouds being tapped by the surrounding hills, down which the resulting torrents pour into the lake.

The plants cultivated for food on the lake shore are rice, manioc (*Jatropha*), Kaffir corn (*Holcus sorghum*), two kinds of ground nuts, the oil of which is excellent, maize, uleysi (*Eleusine corocana*), pumpkin, sweet potatoes, and sugar cane, while the castor oil, tamarind, cotton, tomato, and cucumber grow wild around nearly every village.

The oil-palm is met with both at Ujiji, Urundi, and at the south end of the lake, the Raphia in several luxuriant localities, the *Borassus* largely on the margin of the Malagarasi river, the screw-palm in Uguha, and a single coco-nut-tree flourishes in the garden of an Arab at Ujiji.

Amongst the useful timber trees may be specially noticed the gigantic *mvule*, out of which the canoes are hewn, and the Mingia or African teak, *lignum-vitæ*, ebony; a variety of woods useful for smaller purposes are also to be found, and are worked by the natives.

Extensive tracts of country on the lake shore are still freely roamed over by the larger African animals: two distinct kinds of crocodile were seen. Immense flocks of water-fowl abound in the river mouths and pools, amongst which are noticeable the sacred and the black ibis, three kingfishers (a large dull-coloured bird, a black and white speckled species, and a tiny but most beautiful bird with a prevailing colour of peacock blue). Stanley's water hyenas turned out to be otters, which are frequently seen in quiet creeks and bays. A collection of twenty-one species of shells from the lake have been described by Mr. Smith in the 'Proceedings' of the Zoological Society, nine of them as entirely new. The tsetse fly abounds on the lake shores from Ujiji round the south end and so up the west coast as far as Ubwari.

Visit to Mtwara.—The boat *Calabash*, in which my various voyages on the lake were made, was formerly used by an Arab to convey slaves and

ivory across the lake; I myself made the sails and rigged her up somewhat in English fashion. One of my first voyages, after a trip had proved the seaworthiness of my boat, was across to Uguha, first visiting the interesting islands of Kabesa and Kasenge. The former is an oval, conical hill, the top of which is 250 feet above the lake, covered with large, rough, broken pieces of granite, the interstices filled with coarse grass and bushes, and the summit crowned with a miniature forest of trees, tangled in a mass of creepers.

After getting bearings here, I sailed round to the north end of Kasenge, where I expected to find a *dépôt* or settlement, but not a vestige of such is to be found. The landward side of all these islands has grass, water-cane, &c.; while the weather sides are mostly bare, being exposed to the south and south-east winds. There are two small villages upon the island, one having about ten and the other about twelve houses. Kasenge is conspicuous only because it is different from all the other islands, having a smooth, grass-covered mound at its northern extremity, while the others are mostly rugged and tree-covered.

On the 1st of May I landed at Mtowa, on the mainland. Near the landing-place, a few miserable settlements of Wangwana and people belonging to Arab traders by no means add to the beauty of the scene. The native village, half a mile distant, shows better signs of life and activity. Here I visited the chief, Kassanga, jun., whose acquaintance I had previously made in Ujiji. He received me very good-naturedly, said he was glad to see me, and on my telling him I wanted to look at his country a little, he said it was open to me and I could go where I liked. When I returned to the boat he came on board, and was much pleased with some of the white man's wonderful things, none of which, however, pleased him so much as the production of fire from a match.

In the afternoon, I climbed the lofty peak of Cape Kahangwa. Our course led us over smooth, rounded hills, covered with thick, long grass, up and through which we pushed our way with great labour. Between each hill was a deep ravine, generally containing a pleasant little running stream; each one a perfect strip of tropical scenery. After a steep climb, the peak itself was reached, and a splendid view rewarded me as I took a round of bearings from Goma and across to Cape Kungwe on the other side of the lake, and to the hills of Murungu in the south. At our feet, and between us and the river Lukuga, lay the great plain on which Ruanda, the capital of Uguha, is situated. These hills are of clay-slate, and slaty sandstone, with loose quartz rich in mica. On our return we struck a path which led us back to Mtowa, along ridges, avoiding almost entirely the deep ravines which had so wearied us. As I passed through Kassanga's village on my return, he came out accompanied by his wife, both in full evening costume, the most striking feature of which is in both cases the elaborate head-dress, so distinctive of the people of Uguha. Kassanga's

wife, one of five or six, was adorned with large spiral wire bracelets, and anklets and necklaces of shells.

The next day I walked over to Ruanda, to visit Kassanga, sen., who is the chief of the whole country. Passing Kahangwa, we skirted by a devious path several of those wonderful rounded hills, with ravines deeper and more romantic than ever; little tropical streamlets, deep in rocky beds, with numerous little cascades over which the water pours clear as crystal. Finally descending rapidly to the plain, on the other side of which is Ruanda, we entered upon a flat expanse of black mud cracking in the sun, and overgrown with rank grass and weeds, but with very few trees; in the rains it must be in places a terrible morass. Ruanda itself is quite a wonder in these parts, and is conspicuous on this plain by a sprinkling of the Bombax or cotton-tree in and about it. It consists of at least 400 houses, which, for the most part, are built so regularly as to form long streets, giving an unusual appearance of tidiness to the place. Considerable spaces are kept clear and swept, and here and there rudely carved posts with double-faced human heads serve to remind the people of reverence due to their departed ancestors—their guardian spirits. The Uguha houses are built with a square frame and all the upright ends gathered together in a point at the top; but the thatch is put on so thickly that when finished they present a perfectly round beehive shape, with a bunch on the top where the uppermost thatching is securely fastened together.

I was pleased to observe in active operation numerous industries of a superior kind and on a larger scale than I had seen anywhere else on the lake shores: pottery, matting, and baskets of many kinds, wooden bowls and dishes, and wooden drums, were the chief articles manufactured. There were also blacksmiths and coppersmiths, but I think their neighbours, the Warua, supply them chiefly in metal wares. The people appeared cheerful, healthy, and well-behaved. I found the great Kassanga himself was absent. The people trooped together in large numbers to get a sight of the white man, but there was no impertinence or ill-feeling, only what appeared to be a pleased curiosity. I walked on to an Arab camp or settlement—an assembly of small grass houses in which the Arabs live, and smaller huts for their slaves and porters. Here they assemble and arrange their caravans before proceeding westward.

The Lukuga Outlet.—I got back to Mtowa just before sundown, and had a long consultation with Kassanga, jun., about the Lukuga river. He told me I was quite welcome to go there, but it was a dangerous place, and some Arabs' boats had come to grief in the river. He seriously warned me not to attempt to reach the Lukuga by land, and refused to send two or three of his men with me. I told him I should start on the morrow. Unfavourable winds, however, in the morning prevented my doing so, a state of things to which I was easily

reconciled when I was informed that Kassanga, sen., was in a village close by, and invited the white man to go and see him. I accordingly went to a small village half-an-hour's walk distant in a public place, in which I found quite an assemblage of richly dressed chiefs and warriors, most of them with huge plumes of brightly coloured feathers on their heads. They were evidently awaiting my arrival when I drew near and sat down in their midst. Kassanga's own big house was close by, and the great man being informed of my arrival, shortly afterwards made his appearance. He is an old man, but bears his age well, being sleek and clean, and of cheerful countenance. His manner was somewhat embarrassed, but very friendly; he was dressed very much plainer than most of his chiefs, with a plain calico loin cloth, a white turban, a thick bunch of scarlet feathers on the top of his head in front, whereas his inferiors all wore their feathers on the top behind. His sole ornament was a necklace of large shells, the very largest I have seen.

A friendly conversation ensued in which I endeavoured to make him understand our purpose in coming into Africa, and he replied that the country was open, I could go wherever I liked. At the conclusion he retired into his hut and sent out one of the chiefs with a load of maize-meal very neatly fastened up in a leaf package all ready for transport. This was a formal hospitable welcome to his country.

Some six months afterwards I had the honour of escorting two of my colleagues to this place, and Kassanga's friendship ever since has been proved genuine and lasting. Mr. Griffith, who is in charge of this station, has, up to the last mail, given us most promising accounts of the progress of the Mission.

I started the next afternoon and got well out to windward towards Cape Kungwe, in order to avoid the terrible rocks on the northern side of Cape Kahangwa, a most dangerous shore during the south-east winds which prevail here. A strong breeze coming on from the south, I ran in towards the Lukuga entrance. It was rough work with my inexperienced men, especially this running down upon an almost unknown shore in the hope that I should find a harbour. I was able to recognise the coast as I went along in the immediate neighbourhood of the Lukuga from Captain Cameron's map, which has proved in many of its local details to be most valuable and accurate. I ran right in the Lukuga about 5.30 p.m., finding from three to five fathoms at the entrance. As the entrance narrowed we found ourselves rapidly swept in. In the centre of the swift current were numerous eddies, or calm places in which the boat seemed to halt for a moment before being swept on faster than ever. My men were panic-stricken, and it was with extreme difficulty I could get the little work done that I required from them. The people of Kawe Niangwe's village ran out in alarm at seeing a large boat being swept, as they thought, to utter destruction; but we had no time to attend to their cries, and, notwithstanding

the utmost exertion, we were drawn at least one mile down the river before I could bring the boat to the bank and make her fast.

I at once visited the chief Kawe Niangwe at his village. I found him to be a tall, lively, cheerful-looking man of considerable intelligence, without any of that gloomy mystery so frequently a hindrance to intercourse with these chiefs. He made and answered questions in a straightforward way, and did not beg. He at once acquiesced in my request for a guide for the Lukuga, producing a sharp-looking fellow of some social rank named Mtweta My-y-ya. With this man I started on Saturday morning to explore the river, which of necessity had to be done in a small native canoe, and not in my own more cumbersome boat. Mtweta My-y-ya brought with him three little lads and a large pot of pombe, nor would he provide any other food though he knew my intention was to stop away all night; my man Faragella who accompanied us also neglected to provide food, notwithstanding my protestations; they both anticipated they would tire me and return the same evening, but they were disappointed. We descended the river to Stanley's farthest, the rapids beyond being dangerous for our canoe. Here Mtweta My-y-ya thought I should give in, but landing at once, I directed them to prepare for the march, which they all did unwillingly. However, at last, finding I was determined, they moored the canoe, and hid the paddles and the precious pombe in the grass, doubtless expecting to return in the afternoon. Going about half a mile, we passed the river Rubamba. Mtweta My-y-ya told me that Stanley did not pass here.

I had several good views of the river along the road, and soon saw that the rapids extended only for a distance of half a mile, after which the river widened as before, gently winding.

About two miles and a half on my right I crossed the river Msengela, two miles beyond that passed an empty village, and then the river Kawindi. Soon after this the three lads put their loads down and declared they would go no further. Mtweta My-y-ya doubtless thought this would stop me, but I was determined to ascend the Kiyanja ridge to see the river and to get observations for latitude, so I shouldered one of the loads, and Mtweta My-y-ya was manly enough when I put it to him in that way not to break his agreement, and so he, Faragella, and myself proceeded alone, Mtweta My-y-ya shortly afterwards taking my load in addition to his own. We were now going along a road which he said led to a fisherman's camp, but to get to the ridge we must leave this road and strike across country. This Mtweta My-y-ya hesitated to do, pleading thorns and wild beasts, and various difficulties, and hoping that I might give in. But late in the afternoon we left the road and struck straight across for the Kiyanja. We had already crossed the river Luamuwa; by this valley we crossed it again—a most refreshing little stream—and, struggling through the jungle, reached the base of the Kiyanja ridge.

The ascent was very, very steep—a climb, in fact, necessitating fre-

quent rests; but each halt brought us to a more extensive and glorious outlook than the last. At about 800 feet I selected a camping place, and the men made me a little hut and collected firewood. I mounted afterwards about 300 feet higher, from which elevation I had a bird's-eye view of the Lukuga river flowing far away to the westward. From this place I got bearings, and at night the latitude $5^{\circ} 50'$, which, with the latitude at Kawe Niangwe's village, $5^{\circ} 52' 45''$, will serve as a basis for a sketch of this part of the river. It would have served the men right to let them hunger, for it was all their own fault; I had told them to bring food. Mtweta wandered about and picked up a few seeds, which he chewed, but they looked so miserable that I gave them a small allowance from my own food. The hillside is covered with the same quartz and mica with which the sands of the little river below sparkle. The whole view from this position is very fine and extensive. Beyond lay the distant lake itself, bounded by the lofty peaks of Kungwe; and the winding reaches of the Lukuga lay at our feet as on a plain, a clearly defined and swift river, which, sweeping round the foot of this ridge, is lost to view among the distant hills of Urua. The next morning we tramped back to where we had left the canoe, and reached my boat the same evening.

Mr. Stanley's prediction has been fulfilled: recent news has come that the strength of the Lukuga current is slackened, and, provided with a solid rocky sill, it will probably become the permanent waste-pipe of the lake, maintaining its waters at a pretty constant level.

River Malagarasi.—The river Malagarasi, as one of the largest streams flowing into the lake and situated near Ujiji, naturally attracted my attention. I had to go to its entrance on several occasions to cut timber, to visit the young chief Mtongoro, in order gradually to gain the confidence of the wild and wandering tribes of Kawendi, and twice to ferry parties across the river.

In August 1879, I pulled up the river to explore. The entrance proper is through mazes of papyrus and pith-tree; after one mile, the river narrows between distinct forest-clad banks, in many places completely covered with a thick garment of creepers, then widening out again into a large expanse, with plains on the north and low hills on the south, and quantities of the *Borassus* palm. This place is the haunt of immense numbers of hippopotami and crocodiles, and herds of buffalo, baboons, and other animals. Narrowing again between hills the current became swifter and the river more confined as we turned into the north-easterly reaches. At a distance of $5\frac{1}{2}$ miles from the lake my progress was stopped by a series of rapids formed by the stream flowing down over large pebbles and boulders.

Recent traces of the elephant and buffalo were seen, and the lion was heard at night. I estimated the dimensions of the river, just below the rapids where it is clearly defined between distinct banks, as follows:

width 500 feet, average depth five feet; giving a sectional area of 2500 feet, and flowing at the rate of $4\frac{1}{2}$ knots per hour.

Two months later I again entered the river, and there was then so little water that I could only get one mile beyond the entrance. Before the rains of 1880, I again visited it; the surface of the lake was then of course much lower; I was unable even to enter the barrier of vegetation at the mouth, through which the water was slowly flowing in small quantities. The flood caused by the rains would doubtless excavate the bed deeper, but I think it will be some years before the river is able to be again entered as I had done.

Voyage to the Southern end of the Lake.—In September 1879, we were reinforced at Ujiji by Messrs. Southon and Griffith, and it was determined to occupy the two stations of Urambo and Plymouth Rock. In the spring of 1880 I found opportunity at last to make a voyage round the south end of the lake.

I started from Ujiji on the evening of the 17th of March with a crew of six Wajiji, two Zanzibar men, and my two boys Sambo and Sievedi. Immediately before leaving I was surprised by the arrival of a party of Mr. Thomson's men bringing the startling news that that gentleman had returned to Mtowa with a total loss of outfit. I hurriedly got together a small quantity of wearing apparel and cloth for his use, which I took with me. Arriving at Cape Kabogo next morning, and Kanala Island at 4 p.m. the next day, the wind being very light, I found all well at Mtowa, and that the alarm about Mr. Thomson was much exaggerated. The next day, embarking Mr. Thomson and his men, I proceeded on the voyage, crossing to Cape Kungwe, coasting the highlands south of that cape, exploring the pretty inlet at the mouth of the Calabash river, running past the pirate's island of Kabogo with a splendid fair breeze at night, and arriving at the station of the African International Association in Musamwira on the evening of the 26th. Captain Carter, of the elephant expedition, happened to be camped near the site of the stone house which was then being built, and in true sailor-like fashion showed lights and shouted directions for the best approach. After troublesome navigation for a quarter of a mile through 18 inches of water, with the men overboard pushing the boat, I moored close to the hill. Here we were entertained most hospitably by Captain Carter at his camp, and by Messrs. Cambier and Popelin at the village of Karema; had a ride upon Carter's elephant, and finally started again on our voyage on the evening of the 29th of March.

I was impressed very favourably with the accounts, and with what I saw, of the elephant work. The surviving animal was one which for many years in India had done no work, and Carter was about to leave Karema for the coast to receive some more elephants from India with which he was to start the work of catching and taming the African ones. Why this work has been abandoned I cannot tell. It has been

proved that waggons can be got through, but we cannot use bullock waggons on account of the tsetse. I think it has been proved that elephants can be got through, but that they would not answer because of the immense labour and the number of men required to load and unload them daily, and because of the great weight concentrated on four points on shaky ground. By using elephant waggons both difficulties would be done away with, and both successes usefully combined.

The work of the African International Association at Karema appeared to be proceeding surely though slowly. A stone house of considerable size was being erected upon an elevation close to the lake shore under the care of Captain Cambier, who I must say appeared to me to be carrying out the excellent instructions laid down for the agents of this Association in a most efficient way. The chief result, up to this time, of his presence in that neighbourhood was the evidently increasing prosperity of the natives there. I had visited this place some months before and looked upon it as one of the poorest and most miserable of native settlements on the lake shore. The difference I now observed was remarkable; the people were well clothed, and I doubt if they could easily be prevailed upon voluntarily to part with the presence of the white men in their midst.

A mutual good understanding has always existed upon the lake between ourselves and the gentlemen of this Association, and I understand we are indebted to Captain Cambier's careful observations for the most reliable longitude of a position on the lake shores.

I deeply regret the untimely death of Captain Carter, in whom the work of exploration in Africa has lost one of its finest and most efficient men. Wherever he has passed in the African interior I believe an honest Englishman can pass again, which is saying a great deal, and he was always ready to share his last resources with any one.

Proceeding on our voyage we coasted round the verdant neighbourhood called by Cameron Massi Kambi, rounded capes Kapendi and Mpimbwe, visiting the few villages there, passed Cape Chakuola and entered the Bay of Kirando on the evening of April 1st. Here we found several villages of considerable size, and immense farms with large rice fields. The Makomomo Islands serve to enclose an excellent harbour in this bay which at first sight would appear to afford a fine situation for a station, but in the rains I find there will be a great expanse of marsh. On the southern side, however, which would more frequently be the weather side, the rising ground affords a better site. Much more cultivation is observed as we proceed south and are fairly entered up the coast of Fipa. This is another of the districts of country ruled over by a chief of importance; his name is Kapusi. At the island of Kirui I first made the friendly acquaintance of the Fipa people, a man volunteering to come on board at night to pilot us into a harbour.

I must rapidly pass on south without noticing all the various bays and populous villages of Fipa.

We stopped on Sunday at Msamba Island, evidently a well-to-do place; a half-caste spy here visited us and, as events proved, carried no favourable account of us to the mainland. Visiting the large village of Wampembe we passed on to Pulungu Island, where we were delayed a whole day by the swell that followed the south-west gale, and was a great hindrance to our progress. Here, in the afternoon, we suddenly discovered ourselves surrounded by a force of armed men in the little creek in which we were moored; sent over, as they afterwards acknowledged, in consequence of evil reports of us made by some traders to the chief Kapufi. They were very soon assured, however, by our quiet demeanour, an examination of the boat, and the statements of my Wajiji crew, that there was no harm in the white man, and eventually left for the mainland as a deputation to carry a good report of us to their chief.

At Pulungu Island we rested and slept, starting again at daylight next morning, and now making a closer and more careful survey of the south end. Passing three little steep capes, forming together one broad one, the shore runs well in east to a river on which is situated, I believe, the village Utunduu, described by the Wafipa as the border village; then past the island and peninsula of Micongorlo, where a beautiful little land-locked harbour is surrounded by several villages and extensive farms. I walked across the Micongorlo Peninsula, and saw the Amalesa Islands adjacent. I observed several prosperous villages, and considerable cultivation. Leaving this place with a fine breeze, we passed along the Mpete Peninsula round into Liemba Harbour—a perfect lake-like, land-locked harbour. I could not make out that the natives had any name for the harbour itself, though I got names for all sides and villages round. Of Liemba they knew nothing, except that it was the Kilungu word for lake. I believe no one else has named this place; I would therefore suggest that it retain the name of Liemba Harbour—which, if it means “lake-like harbour,” is by no means inappropriately applied to it; the name Liemba was apparently first given to this part of Tanganyika by Dr. Livingstone. Liemba Harbour is roughly circular in form. At its head is a tiny peninsula, Ikyoni, behind which I moored the boat. It is like a little world in itself, the home of a herd of hippopotami, and very numerous water-fowl and other birds. I saw traces of numbers of buffalo in the neighbourhood, and other large game. I also observed wild grapes in a strong shrub-like form. On the mainland side the shores ascend steeply from the lake to the lofty plateau above. At night rain came on, and continued without ceasing.

Next morning, moving across to the Kalambo side, we made friends with the natives there. I found that the chief of the district was a woman—“Sultani Mwema”—that is, “the good chief,” and no other name

could I get. This princess lives in the village of Katete, about 2000 feet above the lake. As it was described to be near, I determined to pay the lady a visit. A terribly steep walk through an interminable forest of tall straight trees, the path very often almost like a flight of steps, took me up to the heights above; but, as the afternoon was drawing to a close, I put off my visit to the next day, and returned to the boat. Early next morning I was told that Sultani Mwema was coming in person to meet me. She appeared about 10 o'clock, with a numerous train of ladies-in-waiting. I showed her everything I had in the boat, which she in turn pointed out and explained and criticised to her women. This princess had a self-confident manner, quite different from the ordinary look of the women. She is probably about forty years of age. Her husband was with her—"not the chief," I was told, but "the chief's husband." They appeared much pleased with what they saw, and after I had explained the reasons for our visiting her country, I really think the "good princess" really meant it when she said she should be very pleased to give a place for houses and gardens if white men would come and live as friends in her district. I gave the sultana a suitable present of cloth and beads, and a necklace to each of her women. She gave me some fowls in return, and we parted with the understanding that when I brought my brethren a place should be given them in which to live. As the princess retired, I observed that, though attired in coloured trade cloth, she still wore the national female costume, which I shall describe further on. The natives assured me that Sultani Mwema is the sister of Tafuna, who they say is the chief of all Ulungu; but the word "sister" may only mean "friend," "ally," or "equal in rank." "Mazombe," which appears on some maps, is either the name of the district just inside and south of this, or it simply means "on the heights": there is no village of that name.

Leaving Liemba Harbour, I passed several small rock capes, and Luasi, on the river of that name, with its wall-like cliffs, then the great bluff cape Yamini, with its jagged and weather-worn perpendicular cliffs, after which the hills recede, leaving a small space of lowland about the village Mufinga, a small place of eleven huts, where we stopped for the night.

Rounding the little peninsula of Kirongo, we passed some low rocky cliffs, a tract of thick forest, and small broken hills; beyond these, towards the Malwe river, lower land at the foot of the hills permits movement along the shore, and the scenery wears a general dry, though picturesque aspect, the surface consisting of red earth, quartz rock, and hard sandstone set off with groups of *Borassus* palms.

The entrance to Malwe river—itself a mere torrent—is quite a gap, forming behind a sandy cape quite a snug little harbour; a delta of low land is closed in by precipitous hills, the delta itself choked up with a dense growth of palms and grasses, amongst which, in a clearing of

gardens, is the stockaded village of Malwe. Although evidently stockaded for defence, there is no ditch, as in the countries north. The people, apparently poor, make up for more valuable ornaments by wearing sambo of yellow grass, which much resembles copper when seen from a distance. A strong south-west wind detained me here till late in the afternoon, when it shifted to the north-west, and with a fresh breeze I stood out and laid along to the Kowa river, which I reached in the evening. With a following sea, I could not venture to enter the river mouth, so went up into a corner on a soft bed of mud. Rain fell during the night, preventing observations. I started again at daylight, rounding Cape Nyanzowe, after which the highlands approached closer to shore again, the drainage gaps becoming deep cuttings. Kalambo river is in one of these; it forms an extensive but shallow boat-harbour, much choked with weeds. Precipitous mountains rise abruptly from a valley a quarter to three-quarters of a mile across, rising gradually and narrowing at once till it seems lost in a narrow cleft between precipices of 1000 feet, but again opening shows two other ravines converging to this point, and each bringing down a stream which unite to form a broad and rushing torrent, that, roaring over huge boulders, washes the precipice on the south side with a noise resounding throughout the valley.

Jagged, discoloured patches of bare rock stand out among the trees with which the hillsides are elsewhere covered, except where a few clearings with waving corn testify to some perseverance on the part of the natives; for even these clearings can only be reached by a steep climb. Two small clearings occupy the level ground by the river mouth, and others are situated on natural landings at intervals on the great staircase at the head of the valley leading up into the interior. I walked up to one of these, a small village called Mukipwa, the chief of which is named Mpuliamba, who told me he had seen Mr. Thomson the day before, at Pongorlo, on the Unyanyembe route. The people seemed somewhat listless at first, but on finding we wanted to buy food they soon trooped down to the boat with various produce, and a friendly intercourse was opened. These were the last villages I found on the eastern shore. The steeper hills now retired somewhat from the shore, leaving a space of small broken hills and little stony capes.

The district of Kituta was reached on the 21st April, at the river mouth which Stanley terms the extreme south end of the lake, the extreme south however is really at Pambete. I cannot improve on Stanley's description of the dense dark grove of trees at this river mouth, which forms a very conspicuous mark from a distance. A few fishermen approached from the Lonzua river and invited me to proceed there, which, indeed, was necessary if I would hold intercourse with the natives, there being no signs of habitations where I then was. I found a road, however, passing round the lake end which seemed tolerably well used. We moved on therefore to the Lonzua river, approaching the steep landing-

place through a wilderness of dead tree stumps and clumps of reeds. This river is a torrent, rushing down a steep and rocky declivity. On the top of the ridge are many scattered farms and small villages. A friendly native soon attached himself to me as guide and informant, and I also obtained a guide to go to Zombe's on the morrow. At daylight, putting the boat aground in a safe place on the south shore, we started. Very near our camp we found a path running east and west, and then turning north along the lake shore; this is a branch of the caravan road from Liendwe to Unyanyembe; the other, and probably the principal, one passing through Isoko and Zombe's. To go to Zombe's we crossed this path, trending east, however, for some distance, and continually mounting upwards, first through tangled wood full of rocks, and then through more regular forest. In three hours I reached what I at first supposed to be the top at 2400 feet. The country here extends far and wide in bold undulations of rich forest lands; still no villages, but in the forest I came across a party of hunters. They had an immense net about half a mile in length and six feet high and with meshes from two to three inches square, kept in position by stakes and stays at intervals. It was placed in what I suppose was meant for a straight line, with watchers at about every 200 yards; this must be a work requiring a considerable amount of well-arranged partnership, the net being all in separate lengths of about 50 or 60 feet belonging to different men.

After leaving the hunting party I descended to the small river Muswira; half an hour further a small village of ten houses, and then a scattered series of isolated farmhouses, each surrounded with its little fortification, or *boma*. From one of these a man became our guide for a short distance, taking us to the outskirts of this farm district, and indicating to us the forest path we were again to follow. We now gradually rose again to about 2500 feet through the same fine forest land, crossing two little rivers with very cool water. The last of these streams we followed up for some time, where it runs through steep banks crowded with ferns and mosses and other damp-loving light green vegetation, with the gigantic *moowali* palms (*Raphia*) arching over the verdant tunnels, completing a scene refreshing in the extreme. These *Raphia* are splendid trees, many of the leaves being 40 feet long, and supplying the beautiful and strong fibre of which the well-known Manyema cloth is made, and serving a variety of purposes of utility and ornament. The mid-ribs of the leaves form excellent rafters for small houses, and are also used for frames of bedsteads and many other purposes. Crossing the stream we ascended to dry, bare, stony ground, and soon came again to scattered farms, which proved to be the outlying parts of Zombe's neighbourhood, whose town I reached after a march of about 16 miles from the lake, at an elevation of 2300 feet above its shores. Coming from the lake I continued to feel even here that I was up aloft; each horizon seemed to be the edge beyond which one

would at once descend to ordinary levels. I think this was due to the change of air as well as to the actual fact of having ascended from the lake.

Zombe's is a large fortified town subdivided by other stockades into several compartments, so that in the village one is continually passing through gates. On the north side of the town is a stream descending into the Kalambo river, which I was told forms a natural barrier, and its dense margin of moowali palms and other tall trees of bright fresh verdure displays a pleasing background to the scene as approached from the west by the forest road. Extensive gardens dot the country, which on all sides is covered with a fresh bright growth—whether of forest trees or shrubs and grass. A small herd of well-favoured kine with barrel-like bodies, and the passing to and fro of the numerous people loaded with the produce of their gardens, made up a picture which I found very interesting and refreshing after my voyage, and seemed to speak of grand possibilities for the country in the future.

Having seated myself comfortably with my Wajiji round me, I sent a message to Zombe to say I had come to see him. The usual difficulties were thrown in my way, and it was not till next morning that I saw the chief, who then came to visit me. He is rather a large man, with the peculiar air of watchfulness I had noticed in Mirambo. He was clothed in a blue and grey cotton counterpane, ornaments of substantial copper sambo, and carried a neat axe—a sort of wand of office. He informed me that his river joins the Kalambo; that Pongorlo is three days' march from there; that he thought the white men were good, and would give them a place to live in either at his town or between that and the lake. He said that the Watuta used to give him some trouble, but they had gone away now; and truly he seems to keep his people under command, though I observed that men, women, and children alike approached and saluted him without fear. He remembered the party passing with Livingstone's dead body, and Mr. Stewart and Mr. Thomson had both visited him. After breakfast I walked outside, and found Zombe seated on a huge ash-heap just outside the town—a sort of quarterdeck place of observation, from whence he could see his cattle and all outcomers and ingoers, and whence he kept up an almost continuous clapping of hands in answer to the respectful salutes of his passing subjects.

Zombe's village has about 120 houses, and besides the cattle already mentioned, some fine goats and sheep. I sent him some good coloured cloths and glass beads, and he thoroughly enjoyed the exhibition and description of every article I possessed of European manufacture.

In the afternoon I returned his visit. His own house has the river close behind it. His wife was a superior sort of woman, to whom I felt bound to make a little present. Zombe continued on the same friendly terms with me during my stay, and promised an escort in the morning, and he himself attended to wish me a most cordial farewell.

Returning to the shore at Kituta, I got careful observations for latitude, which I made to be $8^{\circ} 46' 30''$, surveyed closely round the peninsula of Kapata, and rounded the island of Mtondwe, where I also got latitude and bearings. The south end of this island is low, and the north end bluff. Coasted with leading winds to Kasakalowa, stopping by the way at the villages of Kondo and Niumkorlo; the latter has a fine little harbour, at the north side of which is a prominent round hill on a peninsula. On Livingstone's map this, and also the peninsula of Msenga in Itawa, are marked as islands, and from the distance at which he saw them they would doubtless appear so.

Kasakalowa is a village of about forty houses. There is a space of some extent here of lower hills and beach between the Kapata ridge and the south-west corner of the lake, and in this space are the villages of Kasakalowa and Pambete at the real south end of the lake, in lat. $8^{\circ} 47' 30''$. Just halting for rest and bearings, I then turned up the west coast. Here the mountains rise steeply from the lake shore, but still on the slopes there are numerous villages and farms; perpendicular cliffs of weather-stained rock stand out at great heights among the trees.

Leaving Mwangala in the evening, I pulled on, hoping to reach a gap I had seen in the mountains, which I supposed to be Cameron's river Kiazu; but as we made slow headway against the swell, it was dark before I made out any available landing. The night proved extremely dark, and just after sunset, a slashing breeze springing up from the southward, I determined that as I could not survey, I would at any rate make a passage, and ran into the Lofu river before the morning. Here, securing the latitude and compass variation, my survey of Ulungu was completed. Both as regards the people and the country, I had been agreeably disappointed. I had expected to find a scattered and mixed people, but I found them to be a distinct tribe, with their own peculiar customs, dress, arms, and houses. The most characteristic article of dress is the goatskin garment worn by the women; the top part being unconfined, it hinges, as it were, at the waist, so that on sitting down it at once swings into its proper place as a mat or carpet; the lower end is scalloped in a set pattern.

The most common grain is the *uleysi*, cultivated in circular forest clearings, watched from huts raised on high poles. The nether mill-stones used by the Walungu are neatly imbedded in a plaster bench or table, with a receptacle for the meal.

Uganga, in its various forms of fetishes, miniature sacred huts, and mystical performances, flourishes in every small village. The tsetse fly was seen in all parts, even to within half a mile of Zombe's village, the only place where cattle are kept. Cotton is cultivated largely, and cloth made as at Ujiji. The bow of the Walungu and Wafipa is peculiar, having two elbows in it, instead of being, as usual, the segment of a

circle, and a tassel of long dark hair is attached. Bees are cultivated, and large fish-traps are anchored off the shore to entice the large and oily *senga*.

After visiting the chief Muriro, at Akalunga in Itawa, and the southern portion of Marungu, a strong south-west gale decided me to run north, calling once more at the station of the African International Association and at Plymouth Rock. I arrived at Ujiji on May 2nd, after a voyage of sixty-two days, costing in food, pay of men, presents to chiefs, &c., about 150 dollars. The employment of the Ujiji natives in this way was a grand success; by living with me in the boat all this time we had got thoroughly acquainted with each other, and these men did excellent service in speaking well of me, not only in the various countries visited, but also among their own people on our return.

Ujiji.—It is difficult to think of Lake Tanganyika apart from Ujiji. Ujiji is a country situated upon the eastern shores of the lake, originally ruled over by a sultan or native head chief, but actually by some two or three leading men, called Mutwali, amongst the chiefs of the thirty or forty counties or districts into which the country is divided. I roughly estimate the country to contain about 700 to 800 square miles. The population is much larger than a hasty survey would indicate, the country people on the heights living in populous villages. What is most frequently known as Ujiji, however, is the metropolis of that country, and it may be said of Tanganyika, a straggling town spreading over portions of two of those divisions, namely Ugoy and Kawele, and forming the headquarters in that neighbourhood of a colony of Arab slave and ivory traders, as well as a native mart frequented by representatives of all the tribes upon the lake shores. It is the terminus of what for years was the only safe and well-known route from the east coast to the lake, and an important station upon a line of traffic, geographically suited and by common consent adopted as convenient right across the continent, and is for all purposes of commerce and communication the centre of the rich district of the Tanganyika. This town of Ujiji is in S. lat. $4^{\circ} 54' 30''$, and E. long. 30° (approx.). I resided at this place a little over two years. From it I made my various voyages on the lake. At Ujiji we lived out a character which so recommended itself to the native mind, that after we had been there a year they volunteered to give us a site for our station, and publicly recognised us as their friends in spite of all the opposition and slander of the Arabs.

At this place, in its very stronghold, we struck a deadly blow at the slave traffic of Central Africa, so that from the day of our arrival the public exposure of slaves for sale ceased, and was only carried on as admittedly contraband. By an apparent desire to settle at this place, we were permitted unmolested to spread out to other localities in the hope

that, getting there, we should abandon Ujiji to its old unmolested iniquities; for, as in African travel there are times when it needs all the stimulus of a determination to cross the continent in order to complete one day's march; so nothing short of aiming at a settlement in their very headquarters would have given us the prestige necessary to settle in any part of those regions, over which these Arab settlers undoubtedly have the power to oppose us.

No better locality could have been chosen, not only from its never-to-be-forgotten associations, but from the fact that at Ujiji natives from all the lake countries assemble; that news is to be obtained and communication kept up; and, moreover, that amongst the low-lying lands surrounding the lake (which must necessarily be the scene of pioneer work, before we can build permanent stations on healthy elevations) there are few, if any, positions healthier than Ujiji. It is situated on one of the few small stretches of east and west coast, a position which opens the neighbourhood to the healthy influences of the southerly winds. The house I resided in at Ujiji was in the highest part of the town, and subject to an almost continual fresh breeze.

It has been unfortunate for the good name of Ujiji in this respect, however, that it has often been the scene of the illness and death so frequently the result of the long and trying journey from the coast. But a long residence there has never yet proved fatal. I think I may say that no traveller has come out of Central African work in better health than myself, and I resided at Ujiji longer than any European has yet done. My colleague Mr. Hutley comes next, and at the present moment he is the oldest of our residents in those regions. His recent illness followed his one year's residence in another locality than Ujiji, and from whence another of our men is also returning disabled. Since leaving Ujiji in October last, after a residence there of two years, I have had no fever, and the Royal Geographical Society's traveller, Mr. Thomson, speaks most favourably also of the place.

It is interesting to note that whilst, in 1879, 29·78 inches of rain fell at Ujiji, there fell in London during the same year 30·13 inches, a difference of not half an inch. In 1878 nearly an inch more than that fell in London, and in the only two months recorded at Ujiji in that year the rain was also in excess of the corresponding period in 1879.

Of the rain of 1880 at Ujiji I have only records up to October, but, adding to that the average of the preceding two years for November and December, we have for 1880 27·34, a difference again from the London rainfall of that year, of just half an inch.

The hottest time of the year at Ujiji has been before and after the early rains in September and November, with a maximum in the house of 83°; the coldest in July, with a minimum, outside, of 58°, the ordinary temperature in the house being 76° to 79°.

In both the years 1879 and 1880 the approach of the rains was faithfully indicated by the highest range between the wet and dry bulb thermometers, which occurred in both those years the day before the first rain.

Your Society has proved it possible for Englishmen to traverse these regions successfully and safely. The London Missionary Society has proved it possible for them to reside upon the lake shores in friendly relations with its natives, and in safe, if not friendly, relations with the Arab colonists; but amongst these I can point to many now whom I know would remain neutral, if not actually friendly, who, when we first arrived, were strong to oppose us.

I wish to bear public testimony to the fact that Mohammed Bogharib most certainly saved my life on one memorable occasion, and to remind you that this good old man did a like service for Dr. Livingstone. If on my return to Africa I could convey to Bogharib some testimony of the gratitude of our friends in England, I should be very pleased to do so.

Concluding Remarks.—But to conclude. Beyond this lake lie immense unexplored regions. The London Missionary Society recognises its stations on the lake as forming only a basis for the spread of missionary operations across the continent; and I would remind your Society that while, with Zanzibar for a basis, travellers have seldom penetrated much beyond the lake,—if they selected some such point as Ujiji for a similar base, wide and valuable explorations still further afield could be made with almost equal facility.

A kind of depôt or headquarters might be made there, from which the explorer, relieved from the great strain and anxiety of the journey, could calmly regard and settle down to the work before him, and where a transit instrument could be set up. Even by the so-called old route a traveller, lightly laden, could march from the coast to Ujiji in seventy days, to which place supplies could be safely forwarded without his being burdened with the care and delay of a laden caravan. A party of African natives, without Europeans, are just now taking in the annual supply to our mission stations. The expense of residence would be trifling compared with that of the large party to be constantly maintained in caravan work, and the missionaries resident in the district would, I trust, ever afford a companionship and assistance, which more than one traveller has spoken of as being the reverse of depressing. For my part, I would most heartily welcome, as a means of recommending Christian civilisation to the natives, the presence of any upright English gentleman.

I cannot possibly include in this paper an account of the other voyages I made upon the lake, but each country has been visited, and wherever I have been able to come face to face with the real natives I have never failed to make some friendly negotiations, and at several points we have

distinct invitations to settle. There have been cases of mistaken identity, as when the people of Goma stoned me at night from their lofty hillsides; but when daylight revealed my white skin I was heartily welcomed to their shores.

Farther reinforcements to our party having arrived at Ujiji in October 1880, I was at liberty to return to England to arrange for the new vessel which we hoped to obtain for service on the lake, for the further visiting of the people and the maintenance in efficiency of stations on its shores. I left Ujiji on the 3rd of November last year, and reached the coast in sixty-two days, meeting with a friendly reception all along the road, which we ourselves may truly be said to have opened up to the passage of Europeans.

The London Missionary Society have now determined to build and send out an efficient steam vessel in sections, and also to make fair trial of the new route by Lake Nyassa, though at the same time they see the importance of keeping open the old route, which now has four mission stations on it. The proposed new road between the lakes Nyassa and Tanganyika will form the connecting link (the steamer once being on Tanganyika), completing a chain of communication in English hands and by English means (including the coast-lines of the two lakes) of about 2000 miles. The carrying into operation of these two last links—viz. the making of that road and the transport and launch of the steamer—will certainly be watched with interest by the friends of Africa, and, I trust, not allowed to fail.

The few results of general interest I have been able to place before geographers must be remembered to have been gathered amidst the pressure of the more immediate work of our Mission. I do not know how the cost in money of this work compares with that of other extensive African expeditions, past or present—perhaps not unfavourably—but the work has been done throughout upon the principles it has been planned to disseminate, without any bloodshed or disturbance between Europeans and natives, and with the loss of only some three or four of our porters from natural causes. I think I may say that a permanent way through the territories of some sixteen Central African tribes, representing a line of over 1500 miles of hitherto almost unknown country, has been secured, in the course of accomplishing which I have myself walked about 2500 miles and sailed over 1000. Three stations have been established in important centres, at two of which at least Christian influence is at the present moment gaining ground.

Whether the *ordinary* duties and responsibilities of English residents at these stations have been fulfilled by the missionaries, it is for the British and French Governments, the Royal Geographical Society, the African International Association, and the Roman Catholic missionaries to say. Of the still greater results for which the friends of missions hopefully look, let no man hastily judge.

In introducing the author—

The PRESIDENT said that Mr. Hore was already well known to the Society, having frequently sent them from Central Africa letters of great interest, and he had occasionally taken part in the discussions at the meetings. His special work in the London Missionary Society's operations on Lake Tanganyika, pointed out by his nautical education, was the thorough survey of the region, and the study of the inhabitants before the Mission entered upon its spiritual work. Although the name of Tanganyika was now very familiar, it is only twenty-three years ago that the lake was discovered by Burton and Speke. Since that time it had been visited successively by Livingstone, Stanley, Cameron, and Thomson, all of whom had furnished interesting observations regarding it, but by none of them had so complete an examination of the lake been made as by Mr. Hore. He was, therefore, sure that the Society would welcome the account he had to give of the longest fresh-water lake in the world. The lakes of North America had formerly been regarded as the chief instances of lakes of a large size, but Tanganyika was at least 100 miles longer than Lake Michigan, to which in form it bore most resemblance.

After the paper:—

Commander V. L. CAMERON said he had listened with great pleasure to Mr. Hore's description of Tanganyika. It was only by chance that he was now present, as he was only paying a short visit to England, and would be on his return to the West Coast of Africa in a few days. Seven and a half years had passed since he visited the lake, and his memory might not be very accurate about everything that he saw, but Mr. Hore's description of the southern end seemed to tally pretty well with the map he (Commander Cameron) had published. He had simply made one cruise around the southern end, while Mr. Hore had been in the district for over three years, and therefore his knowledge must be fuller than his own. With regard to the stone instruments mentioned by Mr. Hore, he had seen, not only near Tanganyika but in other places, similar pieces of stone used as a weight on a rough stick in digging by women who could not afford a piece of iron. The stone gave extra weight to the stick. With regard to the differences in names, he had two Ujiji guides with him, and these men gave different names to almost every river. After a long argument he had finally to fix on the one which he thought was the most correct. He did not know that Stanley had ever spoken of water hyenas, but he himself had at home two skins of Tanganyika otters which he shot on the lake. He never dreamt that they were anything else but otters. He complimented the lecturer on his perfect accuracy with regard to Ruanda. He (Commander Cameron) well remembered the long line of streets, and the people turning out to look at him. It was connected in his mind with a rather comical incident. As he was marching to his camp an unfortunate sheep walked in front crying "baa, baa," as if he were heralding the approach of the white man. It was quite true that the rainfall on the lake varied from year to year in localities a very short distance from each other, and also according to the prevalence of the winds. With regard to the Lukuga, when Speke visited the islands close to Plymouth Rock, he spoke about a current setting in a peculiar direction, but he did not give any further particulars. Dr. Livingstone, the next visitor, passed by the outlet without seeing it, but described the vegetation setting towards that point. Before he (Commander Cameron) left Ujiji he heard very contradictory accounts about the outfall of the lake, and he wanted to enter every indentation where there was any chance of there being an outfall. He was guided partly by the breaks in the mountains, and partly by the names of the capes, some of which in the native language meant Cape Door—the door-posts of the outlet of the lake. Mr. Hore had been fortunate enough to see the outlet of the lake in full flow. The outflow from the Lukuga was

formerly checked by the thick growth of aquatic vegetation. He had himself walked across the floating vegetation on Lake Moero, and at other places. It was curious to note, with respect to this phenomenon, that in an old book published by Ogilby in 1670, there was a description of floating vegetation of this nature, which gradually sank, but after a number of years was swept away. Sir Samuel Baker, as they all knew, had to cut his way on the White Nile through the same kind of obstructions. For many years previously the Nile had not risen to its ordinary height, and there was a scarcity in Egypt in consequence; but when Sir Samuel Baker cut through the vegetation, above which great lakes and swamps had been formed, those lakes and swamps were drained, and the Nile then resumed its normal rising. He believed that the same sort of vegetation had choked up the outlet of the lake, but when a small rise occurred above the ordinary level the water swept it away, and then the extra weight of water also swept away the hard clay sill that was across the entrance to the lake, where he saw the *sud* and the filtering of water through it. The Rugumba, forming its delta to the north, had brought down clay which made a hard sill, and now when the current was moderating, and the lake was resuming its normal level, the sill was again forming, and unless it was kept clear the lake might be again closed as it was when Stanley and he were there.

Mr. R. N. CUST said, that since Mr. Hore left Tanganyika, that region had been the scene of a great misfortune. Three European lives had fallen at the hands of the natives. Mr. Hore had described how kind the natives had been to him, and how happily he had spent three years among them. In the public press he had come forward as their champion, to defend them from the charge of being murderers and assassins. It was desirable that the exact circumstances, under which the three Europeans perished, should be stated. There could be no doubt as to the fact, because the Archbishop of Algiers had published an account of it. In Urundu, on the north-east side of the lake, there was a Roman Catholic Mission, consisting of four priests and one brother, an unordained missionary. They had been settled there for some time, and according to the custom of the French Roman Catholics, they commenced their work in this way. They presented arms, accoutrements, and gunpowder to the chiefs, and then began a system of purchasing slaves, under the name of "redeeming" them. Slave children were thus bought and educated. That was admitted by the Archbishop himself. How were those slaves obtained? Naturally, one tribe plundered another for them. The people of Urundu obtained the children from the Wabakári, who of course wished to get them back again. A system of reprisals commenced, and the Wabakári kidnapped and enticed away the children, who were the property of the missionaries. This went on for some time, until at last the missionaries sent to ask for one boy to be restored to them, adding that, if the request were not complied with, they would use force to recover him. The Wabakári took them at their word, and used force first. They suddenly invaded the missionary camp. Two unfortunate priests and one Belgian Pontifical Zouave stepped out of their hut, the latter with arms in his hands. The Wabakári, seeing this, at once delivered a shower of arrows, and killed them all. When the other missionaries came out of the hut, they saw the natives running away, frightened at what they had done. The unfortunate Europeans thus fell victims to their own bad system of dealing with the Africans. Cannivance had been attributed to the Arabs, but there was no proof that the Arabs had anything to do with it. Mr. Hore had shown that, if not entirely friendly to Europeans, the Arabs were certainly not hostile. They behaved well to Cameron and Stanley, and although their system of slave-dealing was being opposed, they had not shown any marked hostility.

The PRESIDENT, in returning thanks to Mr. Hore for his paper, said it was the first

account of Tanganyika given by one who had actually resided there for a considerable time. Mr. Hore had had ampler means of becoming acquainted with the character of the inhabitants than a traveller who merely passed through the country. What had already been accomplished there must inspire great confidence in the future. As he had previously said, only twenty-three years had elapsed since the discovery of Tanganyika, but now the whole of the shores, a length of 900 miles, had been surveyed, and observations of the most reassuring character had been made on the disposition of the inhabitants. Whether the tribes along the Congo were cannibals or not, and even some of them were as hostile to strangers as Stanley had described them to be, it was quite clear that in the neighbourhood of Tanganyika the natives were peacefully disposed, glad to welcome white men and Christians. There was another very encouraging fact. One of the great objects of the International African Exploration Society was to diminish the difficulties of African travel by planting stations which should become fresh starting-points for the traveller. Hitherto an explorer had had to collect his carriers at Zanzibar, and to traverse immense distances which were pretty well known, before setting out on fresh explorations; but the effect of establishing missions and stations at Ujiji and other towns would be to make those places new starting-points, at which goods could be accumulated, and carriers obtained. The Society would be pleased to know that Mr. Hore had materials for several other interesting papers, and before long he would no doubt give another address, which would enable the members still better to understand the people whose characters he had had such opportunities of studying.

*Measures for the Search and Relief of the United States 'Jeannette'
Arctic Expedition.*

By C. R. MARKHAM, C.B., F.R.S., Secretary R.G.S.

(Read at the Evening Meeting, December 12th, 1881.)

Map, p. 64.

LAST year, at this time, we considered the details of Mr. Leigh Smith's important discoveries along the shores of Franz-Josef Land, and looked forward to the achievement of work of equal interest in the season of 1881. Now, although there is much valuable work to record in several directions within the Arctic Circle, yet there is cause for grave anxiety respecting the safety of many gallant explorers, and our chief duty will be to consider in what way succour may most successfully be conveyed to them.

In that most interesting section of the Arctic regions which is reached from Behring Straits, valuable discoveries have been made this year in the course of operations for the search of the *Jeannette*, and the position of that vessel and of her gallant crew is absorbing men's minds both in the United States and in this country. Before alluding to the work of the searching vessels during the present year, it will be well to refer briefly to the history of the missing expedition. The *Jeannette* was formerly the *Pandora*, the old naval gunboat which was bought by

Sir Allen Young, and on board of which he made his two voyages up Baffin Bay in 1875 and 1876. She was purchased by Mr. Gordon Bennett, who changed her name, and selected her for his expedition of discovery northwards from Behring Straits. It is reported that this expedition was equipped and supplied by its munificent projector at a cost of 68,000*l*. But as regards its organisation, it was made a public and national undertaking by special Acts of the United States Congress. The vessel is placed under martial law, is officered from the Navy, and thus has all the advantages which naval discipline gives to such enterprises. Officers and crew number thirty-two souls. The commander, Lieutenant De Long, U.S.N., had acquired experience in ice navigation on board the *Tigress*, when that vessel went up Baffin Bay in 1873, in search of the *Polaris*. The scientific staff consists of Mr. J. J. Collins as meteorologist, Mr. R. L. Newcomb as astronomer, and Mr. Brooks, from the Smithsonian Institute, as naturalist.*

The *Jeannette* sailed from San Francisco on the 8th of July, 1879, and was last seen, steaming towards Wrangell Land, on the 3rd of September. There was subsequently a report that a steamer had been seen off the mouth of the Lena on the 13th of the same month (o. s. ?). The *Jeannette* was provisioned for three years, and although I am not aware that her instructions have ever been published, it is understood that Lieutenant De Long was ordered to make the best of his way northward on about the meridian or westward of Wrangell Land.

In the season of 1880 the small revenue steamer *Thomas Corwin* was sent up Behring Straits, with the object of obtaining tidings of the *Jeannette*, but was unable to reach Wrangell Land, and returned without any results. When the second winter of her absence had passed, it was very properly decided that a more thorough search should be undertaken during the season of 1881, especially as two whalers were also missing.

Accordingly two searching steamers were despatched from San Francisco, the *Thomas Corwin* and the *Rodgers*.

The *Corwin* sailed on the 4th of May of the present year, under the command of Captain C. L. Hooper. Rounding Cape Serdze-Kamen on the 21st, the two missing whalers were heard of near East Cape from some natives, and Lieutenant Doty was sent with a sledge party to examine them. Both were abandoned by the crews. On July 30th the *Corwin* was off Herald Island, where a party landed, finding the summit to be 1200 feet above the sea. The explorers succeeded in reaching the south-east coast of Wrangell Land on August 12th, at the mouth of a stream 75 yards wide and 12 feet deep, with a current running three miles an hour, which they named Clark river. They confirmed the report that a range of hills previously named "Blevin Mountains" extended far to the northward. The *Corwin* was in a furious gale off Herald Island on the 1st

and 2nd of September, and Captain Hooper determined to abandon the search for that season. He returned to San Francisco on the 20th of October. Captain Hooper reports that there is heavy ice pressure at the east end of Wrangell Land; but that a long open passage extends northward, to the eastward of Herald Island, the current setting steadily at the rate of from one to three knots an hour. He describes this passage as being like an ocean river running between fixed banks of ice, either frozen to the bottom or held in place by land on each side; and he believes that the *Jeannette* passed far to the north in this channel. But the whole theory of channel, current, and land has been upset by the more extended and detailed observations of the *Rodgers* during the same season of 1881. The *Corwin* never went north of Herald Island.

The *Rodgers* is a larger and better equipped vessel. She is a barque-rigged steamer of 420 tons, well strengthened for ice navigation, and provisioned for three winters. Her commander, Lieutenant R. M. Berry, was with De Long in the *Tigress*. The other executive officers are Lieutenant Waring and Ensign Hunt, and the complement consists of thirty-five officers and men. The *Rodgers* sailed from San Francisco on the 16th of June, was off Herald Island on August 24th, and, after passing through 12 miles of loose ice, she was anchored in a good harbour on the south coast of Wrangell Land ($70^{\circ} 57' \text{ N. lat.}$) on the 26th.

The complete exploration of Wrangell Land by the officers of the *Rodgers* is a great geographical achievement. For this far-off island, so long just heard of and then at last sighted, but always on the very threshold of the unknown, has been one of the longed-for goals of discovery ever since the Chukches told Baron Wrangell that it could be seen, on a clear day, from Cape Jakan. They said that herds of deer sometimes came from thence across the ice; and their traditions related how the Onkilon, Omoki, and other tribes, had wandered northward over the ice to distant lands. So that there was a halo of romance over this Siberian "Ultima Thule," which was heightened by the gallant but vain efforts of Wrangell himself to reach it by dog sledges in 1822 and 1823. At length it was actually sighted by Captain Kellett in 1849, when he discovered and landed upon Herald Island in $71^{\circ} 12' \text{ N.}$ The American Captain Long also sighted it in 1867, and others have done so since.

But now it has been thoroughly explored, and is a mystery no longer. Wrangell Land turns out to be an island 40 miles broad (between $70^{\circ} 50' \text{ N.}$ and $71^{\circ} 32' \text{ N.}$), and 66 miles long; 80 miles from the nearest point on the Siberian coast; and Herald Island lies 30 miles due east.

After the *Rodgers* was safely anchored in a harbour on the south coast (in $70^{\circ} 57' \text{ N.}$ and $178^{\circ} 10' \text{ W.}$), Captain Berry undertook a journey into the interior, reaching a point about 20 miles inland where, from a

height of 2500 feet, he could see the sea all round except from west to S.S.W., where the view was obstructed by a high range of mountains. He found that two ridges followed the trend of the north and south shores, between which there was a rolling country traversed by streams fed by the melting snow. Several tusks of mammoths were found, and the party returned to the ship on September 3rd.

Captain Berry had despatched two boats, under Lieutenant H. S. Waring and Ensign Hunt, to explore the land to east and west. The eastern expedition started in a whale-boat, on the 29th of August, and that night the party reached Cape Hawaii (a name given by the whalers who had sighted it in former years), encamping on the shore. Next day a cairn erected by a party from the *Corwin* was found, and the most eastern point was rounded, which is marked by a perpendicular column of rock, 100 feet high. Lieutenant Waring walked to the top of a hill which proved to be the extreme north-east point, whence no land could be seen to the north. Heavy pack ice presses upon this eastern shore, and the boat, after narrowly escaping a nip, had to be hauled up on the beach. It was necessary for the party to retreat overland to the ship, a fatiguing journey over a series of hills, in dismal snowstorms. The party returned to the ship on the 7th of September.

Ensign H. J. Hunt, in another boat, went to the westward, rounded the western point, and proceeded along the northern shore until his progress was stopped by heavy ice. The low land runs out in long spits, forming deep bays where the ice is packed in masses along the shore. Here there are lagoons, with plenty of plover and ducks. Drift-wood was found strewn along the shores, and amongst it were utensils of wood and other relics of Siberian tribes, as well as mammoth bones.

After completing this most interesting survey of Wrangell Island, without finding any vestige of the *Jeannette*, Captain Berry proceeded to examine the ice to the northward, in which dangerous service he was occupied from the 14th to the 27th of September. He went first north-east where the ice consisted of large floes, and he entered it, going up a lead until he was brought up against an impenetrable mass. He got through 15 miles of ice and was in a critical position where a southerly gale would have closed up the floes, and made escape impossible. His highest latitude, in this direction, was $73^{\circ} 44' \text{ N.}$ ($171^{\circ} 30' \text{ W.}$), or 132 miles north of Wrangell Island. Here the depth was 82 fathoms. This is the highest latitude yet attained in this sea by 21 miles. Sir Richard Collinson, on August 28th, 1850, was in $73^{\circ} 23' \text{ N.}$, on the meridian of 164° , that is, some 7° (100 miles) farther east.

Returning south, the *Rodgers* succeeded in picking up the whale-boat that had been abandoned on the east point of Wrangell Island; sailed over the imaginary "Blevin Mountains" and "extensive land with high

peaks," reported by the *Cercia*, and Lieutenant Berry then shaped a course northwards once more—this time due north of Wrangell Island. In this direction he reached $73^{\circ} 28' \text{ N.}$ in $179^{\circ} 52' \text{ E.}$, and found the water deepening as he advanced. He had gone to the end of a deep bay in the ice, and he invariably found the temperature several degrees colder in these "pockets," as he calls them, than in the open sea. Large numbers of walrus were seen. The *Rodgers* was here 116 miles due north of Wrangell Island. There was heavy pack to the westward.

My own opinion, based mainly on ethnological considerations, has always been that there is land between the New Siberia Islands and Prince Patrick Island, on about the parallel of 76° N. This is confirmed by the northwards flight of great flocks of birds, seen by the *Vega*.

Lieutenant Berry reports that the sea became deeper as he advanced to the north-eastward, where he found 80 fathoms; but it was shallower at its furthest northern point to the west, only 30 fathoms. He made some careful observations off Herald Island, with a view to clearing up the question of a current which was reported to flow in a north-westerly direction. He found that a tidal current was setting towards the north-west while the tide was flowing, and towards the south-east while it was ebbing. At low water and high water no current was perceptible. The measurements were made at the surface, and at a depth of 10 fathoms.

The *Rodgers* will winter in St. Lawrence Bay, on the Asiatic side of Behring Straits, whence a sledge-party will examine the Siberian coast to the north and west.

It will be the universal opinion among geographers that Lieutenant Berry and the officers and crew of the *Rodgers* have done admirable service to our science, while conducting this important search. They never for a moment lost sight of the humane mission on which they were engaged, but in the course of its execution they have solved a long doubtful geographical problem, examined the position of the ice in a previously unvisited region, and made careful land and hydrographic surveys of great value. We may well congratulate our brother geographers of the United States on these achievements of their gallant countrymen.

The *Rodgers* will continue the search next year both along the Siberian coast, and at the edge of the ice to the northward. Another American party has this year established one of the stations for simultaneous magnetic and meteorological observations, at Point Barrow. This party, organised by the United States Signal Office, left San Francisco on board the *Golden Fleece* in the end of July, in charge of Lieutenant P. H. Ray, of the United States Army, and landed at their station called Ooghlalamie, five miles west of Point Barrow, on the 17th of September. An observatory and dwelling-house for wintering were erected, and exploring work will be undertaken in the spring; so

that a portion of the Arctic coast of North America will thus be examined.

The deepest sympathy has been felt in this country for the missing expedition. We cannot forget the noble way in which Mr. Grinnell and the United States Government and people came forward, not merely with sympathetic words but with active deeds, during the search for Sir John Franklin and his ill-fated but heroic followers. I was myself on board one of the English searching ships that were moored to an ice-floe barring the way westward on September 10th, 1850. And I well remember our feelings of grateful admiration when the two gallant little American schooners, the *Advance* and *Rescue*, put out their ice anchors alongside of us, remained there during a gale of wind, and then beat up through the fast closing ice, to the western end of Griffith Island in company with our squadron. De Haven and Dr. Kane, and the others, nobly represented the feeling of their country—that feeling of sympathy which is filling our hearts now, and making us as anxious for news of the *Jeannette* as Americans were then about the fate of Franklin.

As soon as the certainty that the *Jeannette* could not be relieved this year was apparent, our Council considered how best this Society might take a share in the searching operations of the coming season. It has been ascertained that the *Jeannette* did not touch at Wrangell or Herald Islands: the edge of the ice has been examined far to the north of those islands, and the coast of Siberia as far as North Cape. Our Council thought that arrangements should be made for searching the portions of the Arctic coast of North America that can be reached from the mouth of the Mackenzie river; and Lord Aberdare has made a proposal to the Secretary of State for the Colonies that this should be done through the instrumentality of the Hudson's Bay Company, the Society undertaking to defray a part of the expense. As a proposal to establish a station, for simultaneous observations in concert with those in other parts of the Arctic regions, at Fort Simpson, on the Mackenzie, is now under the consideration of our Government, the two projects might be organised in unison.

Admiral Sir Richard Collinson, who is our highest authority on all points relating to the Arctic seas accessible from Behring Straits, thinks that, as the *Jeannette* never reached Wrangell Land, there is reason to surmise that she may have followed the track of the *Enterprise* in August 1850, to the north-east, on which occasion that vessel reached a position within 630 miles of Prince Patrick Land. Sir Richard thinks that, in the event of the *Jeannette* being beset, the probability is that she would drift slowly to the eastward, in which case he considers that she might emerge from the ice opposite the Mackenzie river, when he considers there is little doubt that her crew would be able to communicate with the Hudson's Bay Company's posts. The accompanying extract from

his Journal * shows that they would probably there receive friendly treatment and assistance from the natives. So far as can be judged from the short trip in sledges, which he made directly north from Camden Bay in the spring of 1854, the pack is very rough and nearly impracticable for sledges, the snow being quite soft between the hummocks, which occasionally attain a height of nearly 30 feet. He saw no floes, and the only level ice was within a few miles of the shore, indicating that portion of the sea which was not covered with pack ice on the setting in of winter.

"Under these circumstances," Sir Richard continues, "the Hudson's Bay Company should be urged to induce the Indians who yearly trade with the Eskimo to proclaim that large rewards would be given for assistance rendered to white men. Captain Maguire of H.M.S. *Plover* so successfully used his influence with the natives that, on meeting the *Enterprise*, they laid ducks, geese, and venison at my feet."

These remarks of so high an authority as Sir Richard Collinson deserve the most careful consideration. They refer to the event of the *Jeannette* having been drifted eastward from a position to the north of Wrangell Island.

But the alternative of the missing vessel having taken the opposite direction ought not to be lost sight of, especially when we remember the report that a steamer had been seen off the mouth of the Lena. The *Jeannette* may, therefore, be detained somewhere in the direction of Cape Chelyuskin. Lieutenant Hovgaard, a distinguished young Danish naval officer, who made the North-East Passage on board the *Vega* with Baron Nordenskiöld, has projected a searching expedition to the northern extreme of Siberia. He believes that the *Jeannette* is to be sought for in that direction. He is now actively engaged in collecting funds to enable him to undertake the search. He possesses experience, zeal, and

* EXTRACT FROM SIR RICHARD COLLINSON'S PRIVATE JOURNAL.

"Visit of the Rat Indians to H.M.S. *Enterprise* in Camden Bay, on July 19th, 1854.

"This delay was so far fortunate as it enabled our friends the Barter Island Eskimos to pay us another visit, and we soon found out they had strangers with them, the chief of whom produced a paper on which was written—

'The printed slips of paper delivered by the officers of H.M.S. *Plover* on the 25th of April, 1854, to the Rat Indians were received at the Hudson's Bay Company's establishment Fort Youcon on the 27th of June, 1854: supposed lat. 66° N. The Rat Indians are in the habit of making periodical trading excursions to the Eskimos along the sea coast. They are a harmless inoffensive set of Indians, ever ready and willing to render every assistance they can to Whites.

'WM. LUCAS HARDISTY,

'Fort Youcon, June 27th, 1854.'

'Clerk in charge.'

"Thus it would appear that it took them twenty-two days to travel from Fort Youcon to the *Enterprise*. This remarkable document was the first communication with the civilised world that reached the *Enterprise* since leaving Fort Clarence on July 10th, 1851. It will, however, show that, in the event of the *Jeannette* being abandoned, and the crew taking refuge on the coast of North America between Point Barrow and the Mackenzie, they would in all probability be favourably received, and assisted either to the Hudson's Bay Company's posts, or to Point Barrow, where they would find the United States Observatory."

youth. He will, I am sure, have the warm sympathy and best wishes of the Fellows of this Society. His project is one which deserves encouragement, for the scheme for succouring the missing explorers will be incomplete unless the search of Cape Chelyuskin, and its vicinity, is provided for.

The American people may be assured that not only do English geographers feel the deepest sympathy for the gallant explorers on board the *Jeannette*, but that we shall gladly and actively do what lies in our power to make the search complete; and to give any aid that may, after due consideration, appear likely to be useful. The debt of gratitude that we owe to the nation which sent forth the *Rescue* and *Adeance* to search for Franklin can never be forgotten by England.

The Dutch Arctic Voyages (1878, 1879, 1880, 1881) and the probable position of Mr. Leigh Smith. By Commodore JANSEN (Royal Dutch Navy), Hon. Corr. Mem. R.G.S. (Councillor of State).

(Read at the Evening Meeting, December 12th, 1881.)

THE first account received this year, by telegram from Vardö in Norway, from Captain H. Van Broekhuizen, commander of the Dutch exploring schooner *Willem Barents*, on the position of the ice in the Spitzbergen Sea during the months of May and June 1881, showed plainly that this has been a most extraordinary south-ice year, in which ice is met with in much lower latitudes than in common years. Such south-ice years are unusual, but a year like 1881, in which the ice (not to call it pack) reached nearly to the North Cape in April, is unknown, even in the old records of the Dutch whalers. Great interest was consequently felt in the investigations of the *Willem Barents* during so unusual a season; and it was a relief when the telegram from Hammerfest, on September 23rd, brought the welcome news of her safe arrival there. She had succeeded in reaching the Orange Islands off the north point of Novaya Zemlya, and in ascertaining the position of the ice-limit in September, from 65° to 33° E. longitude. At that time the explorers were surprised to find the ice in the same latitude as in a common year, and there were no traces of that south-ice which had given the *Willem Barents* so much trouble during the first months of her cruise.

The intention of this paper, written under the impression of great anxiety with regard to the position of the *Eira*, is to submit a few facts, based on the observations of the *Willem Barents* during the last four years, for the consideration of the Royal Geographical Society, and of those who will have to decide upon the steps to be taken for the relief of Mr. Leigh Smith.

The object of the voyages of the *Willem Barents* has been a systematic investigation of the Barents Sea during a course of years so as to be in

a position, after mature consideration of all the probabilities, to select a new base for future polar exploration. All that has been done, and will be done by the *Willem Barents*, is preliminary work, and it must be continued for several years before the desired knowledge can be obtained.

Previous to the year 1872 very little was known of the Barents Sea. Spitzbergen had been circumnavigated, and land had been seen in 1707, at an unknown distance to the eastward of it, by the Dutch whaling Captain Gillis. In later years land had been seen in a lower latitude and closer to Spitzbergen, to the eastward, which was supposed to be the re-discovered Wyche's Land of Purchas. But beyond that, to the eastward, no land was known north of 76° . The large area of the Barents Sea, north of that parallel, was supposed to be covered by impenetrable pack ice which had its southern limit, with slight fluctuations, in about 76° N. Here it was found by the old Dutch whalers, and here it was again found, in 1872, by Weyprecht and Payer in the *Isbjörn*.

But in 1873 the discovery was unexpectedly made by Norwegian fishermen, that all the ice south of Wyche's Land had disappeared, and that they could sail up to, and round that land in August. Exactly at the same time the steamer *Tegethoff* got beset in the ice near Cape Nassau, on the coast of Novaya Zemlya; when she commenced her famous drift which brought her, a year later, to Franz-Josef Land.

The discovery of this land gave an eastern boundary to the Barents Sea on the meridian of the Orange Islands, reached and named by old Barents. The discovery of open water round Wyche's Land showed that the southern ice-limit in the Barents Sea is not fixed, but variable. Consequently the deduction was drawn that by studying the changes in the ice, rules might be learnt for reaching Franz-Josef Land.

The circumstance that open water was found towards and around Wyche's Land, at the very same time when no water could be seen from the mast-head of the *Tegethoff* off Cape Nassau, made it probable that north-westerly gales had blown the ice from Wyche's Land towards Novaya Zemlya, and blocked up the channel between this land and Franz-Josef Land, at the eastern limit of the Barents Sea. If, on the contrary, north or north-easterly gales prevail, it is probable that the ice would be blown away from Franz-Josef Land towards the Barents and Spitzbergen seas, clearing its southern coast from ice.

By investigating the whole area of the Barents Sea it was thought possible that traces might be found and followed, of a warm counter-current forming a lead towards higher latitudes along some coast with a western aspect, as is the case on the west coasts of Spitzbergen and of Greenland.

These considerations led to the voyages of the *Willem Barents*. After our lamented friend Koolemans Beynen had received some training in ice navigation on board the *Pandora* in 1875 and 1876, under so excellent a master as Sir Allen Young, he aroused public spirit in Holland so

successfully as to obtain sufficient funds for an expedition into the Barents Sea.

Several reasons influenced the decision to select a sailing schooner for this service. She had to enter upon a new field of research in an ice-bound sea which is open to the northward, of which the movements were unknown. Its circumstances are quite distinct from those of the intricate channels of the archipelago west of Greenland, where so much experience and so much renown have been gained by British Arctic heroes. The experience in ice navigation there acquired, either with or without steam, is of no avail in the Barents Sea, because the circumstances are entirely different.

No ice pilot or Norwegian fisherman was taken on board in this unexplored sea. Captain and officers of the *Willem Barents* have had to find their own way in this new field of research; and the same officers could not be kept longer than two years, after which they have had to return to the regular service in men-of-war. So that there is the disadvantage of the experience not accumulating in the same person. In spite of these drawbacks good work has been done amidst the continuous fogs of the Barents Sea, surrounded by dangers, and without a hope of assistance in the event of disaster.

As yet our study of the ice in the Barents Sea is incomplete, and it is only the anxiety respecting the position of Mr. Leigh Smith that induces me, in the present imperfect stage of our investigations, to submit a few facts for consideration.

The winter of 1877-78 had been a very mild one in Europe, and the following spring was most beautiful. Early in May 1878 the *Willem Barents* left Ymuiden, the new seaport of Amsterdam, for the first time, to take a general view of the ice west and north of Spitzbergen, to pay a visit to Bear Island, and then to call at Vardö before proceeding to the Barents Sea. She had strict orders, during this first voyage, not to go into the Kara Sea, nor east of Cape Nassau, but to confine her observations to the Barents Sea. She was specially to determine the position of its southern ice-limit in August and September.

The year 1878 was uncommonly favourable. It was ascertained, through information gathered from different sources, that ice had not been met with south of the parallel of 76° N., either in the Barents Sea or more to the eastward. The three straits giving access to the Kara Sea were open, so that fishermen sailed in and beyond it, and discovered Einsamkeit Island, to the east of the north point of Novaya Zemlya.

It was Nordenskiöld's great good fortune that this year, the one in which he undertook to round Cape Chelyuskin, and make the North-East Passage, was so favourable. It appeared as if the Ice King had an interest in the success of this great experiment, which was planned with so much knowledge, foresight, and practical skill.

What a contrast was there between this year and 1873! Then the

Tegethoff had to make her way through ice to Cape Nassau, where she was beset and drifted away in a north-easterly direction without seeing any open water from her mast-head during the whole of September. In the same month of 1878, on the same route, there was open water, and no ice was to be seen.

The great differences in the conditions of the Barents and adjacent seas, in different years, pointed to a general cause variable in its action, rather than to a cause of which the operation produces constant and equal results. Such differences were a great inducement to continue the investigations, and they were, at the same time, a warning not to arrive at hasty conclusions from a single year's experience.

Traces of a warm counter-current in the Barents Sea were detected by serial temperature observations; but not as a definite strong current making a lane of open water towards more northern latitudes. It had more the appearance of a general northerly and easterly drift in the water, the ice drifting with it when it was calm, and at other times propelled by the wind in every direction. In 1878 the ice in the Barents Sea was found in more or less rotten streams, in 76° N.; and on the 45th meridian (E.) it could be penetrated to a little north of 78° ; but more to the westward the ice was more compressed, and had all the appearance of being pack ice, or small floe-bergs. In September no opening was found in the ice, which stretched in a W.S.W. and E.N.E. direction, in about the parallel of 76° N. from 55° to 40° E. longitude.

The winter of 1878-79 had not been very severe in Europe, but the spring of 1879 was very cold. The *Willem Barents* sailed on her second voyage in the beginning of June, first to determine the position of the ice to the north of North Cape, then to call at Vardö before commencing her observations in the Barents Sea. But this time she had liberty to go into the Kara Sea, and beyond Cape Nassau.

In the same season the *Isbjörn* went out, hired by Sir Henry Gore Booth, who was accompanied by the best man that could be found for co-operation and investigation, Captain A. H. Markham, R.N. This second vessel secured the great advantage of simultaneous observations at different points, which is so valuable in Arctic research.

The three straits into the Kara Sea were closed until August; and even then, towards the end of the month, only the Jugor Strait was open, enabling a steamer to pass with some difficulty. She found a broad lane along the Russian coast, and an ice-field from 20 to 30 miles broad, on the east coast of Novaya Zemlya. This prevented steamers from entering the Kara Sea by way of Waygat or the Matyushin Shar.

East of the boundary line of the Barents Sea, between the Orange Islands and Franz-Josef Land, ice was encountered with an ice-blink above it, and the *Isbjörn* was not able to reach Barents Ice-haven, after rounding the Orange Islands.

The Barents Sea was nearly in the same condition as the year before,

only there were more streams of rotten ice, and nowhere such compressed ice as was found south of Wyche's Land. Attention had been directed to the meridian of 55° E. in 76° N. for more careful inspection, and shaping her course to that point, in the first days of September, the *Willem Barents* went north, in open water, until she sighted Franz-Josef Land. At the very same time the *Isbjörn* could not get much beyond 78° N., a little more to the eastward, in about 45° E.

Captain de Bruyne was satisfied with the great discovery that Franz-Josef Land could be reached in open water. It was of no use to go closer in shore, in a small sailing craft, so late in the season, where he would have run the risk of being beset. He very properly returned home with the news of his success.

Although it was considered that this discovery was of the greatest importance, it did not constitute a sufficiently conclusive body of evidence. More certainty was required that Franz-Josef Land could be reached in two consecutive years, before that land could be selected as a base for future polar research. Consequently the *Willem Barents* was once more sent out, in June 1880; but now in command of Captain H. Van Broekhuizen, who had made the second voyage in her.

After calling at Vardö, Captain Broekhuizen continued the examination of the Barents Sea, visited the Russian station of Karmakuli in Mossel Bay, and went thence to the Matyushin Shar, which he found closed with ice, as in the previous year. But there was open water in the Barents Sea west of Novaya Zemlya. Here and there streams of ice were seen, which it is difficult, in a fog, to recognise as such. Unfortunately the *Willem Barents* struck on a reef extending from Cross Island, and was nearly lost. She was got off, after great exertions, and not without serious injury. Still the captain persisted in an attempt to round the Orange Islands, but near the Ice Cape he found the ice along the eastern boundary of the Barents Sea, in the same position as it was before. He therefore decided to return home.

Steamers had not been able, during 1880, to pass through the straits into the Kara Sea. They had tried to go round the Orange Islands, but only one succeeded, after having been beset for several days. At last she got into the land-water on the east coast, and escaped by way of Matyushin Shar. It was only late in September that M. Sibiriakoff went through the Jugor Strait with two steamers, which arrived at, but did not return from the Yenisei. They found the same conditions in the Kara Sea as in the previous year, only the straits were a little worse.

Mr. Leigh Smith, in his steamer *Eira*, was more fortunate. To his active and energetic initiative we are indebted for information about the southern ice-limit in the Barents Sea in 1880, which we should otherwise have lost owing to the accident which happened to the *Willem Barents*. Mr. Grant, the eminent amateur artist, was this year on board the *Eira*. He had made two previous voyages in the *Willem*

Barents, on board of which vessel we are always glad to have him, as he is looked upon as the good genius of the ship. He thus had the remarkable fortune to reach Franz-Josef Land twice in open water, and this time he was enabled to land at several points.

The *Eira* had been in the Greenland ice and on the north-west coast of Spitzbergen before she proceeded to the Barents Sea. Mr. Leigh Smith first tried to work through the ice in about 45° E.; but the *Eira* could not force her way. She got beset, drifted towards 79° N., and was only extricated by quick determination and great practical skill. Otherwise she would have shared the fate of the *Tegethoff*. This is the great danger in the Barents Sea. The ice carries a ship that is beset in calm weather more and more into, and not out of it.

By shaping a course a little more to the eastward, near the meridian of 55° E., the *Eira* found open water and reached Franz-Josef Land; where Mr. Leigh Smith did admirable work during the two weeks in which he surveyed the coast, and made many important discoveries.

On the eastern side the sea was covered with ice, which he found extending south to 76° N., and this was also the case on the west side of the lane of open water through which he returned. From 76° N. he shaped his course along the ice towards Hope Island, to the north of which he found a great many grounded icebergs. He returned late in September to Hammerfest after a very successful and very interesting cruise.

The fact that Franz-Josef Land had been reached in two consecutive years made a strong argument against our continuing our investigations without a steamer. But against this could be placed the other fact that, in 1874 and 1875, no water could be seen from the mast-head of the *Tegethoff* near Wilczek Island, and that the crew had to drag their boats over ice through which no steamer could have cut, before they reached open water in 76° N. So the *Willem Barents* was repaired for her fourth voyage.

The winter of 1880-81 had been a very severe one in Europe, and the spring of 1881 was very cold, with incessant strong northerly winds in the North Sea. The *Willem Barents* sailed this year early in May, with orders to go along the west ice to the north of Spitzbergen, and to return from thence to Vardö. After leaving that place she was to attempt to get into the Kara Sea towards Dickson's Harbour, where Dr. Buys Ballot desired to establish a Dutch station, to co-operate with other international Polar stations. She was finally, in September, to determine the southern ice-limit in the Barents Sea.

South of Jan Mayen Island close ice was encountered in 69° N., and, in following its edge in an E.N.E. direction, no lane of water could be detected. The captain returned to Vardö to report and ask permission to try again, which was granted. This time he succeeded in working his sailing schooner through the ice, up to the south cape of Spitzbergen, but not without great difficulty. He was informed that Stor-Fjord was entirely free of ice. It appeared as if northerly or north-westerly gales

had blown all the ice against the drift of the warm current to the south and south-east, so as to cover it with masses of ice, which are usually confined to the polar ice-bearing currents.

Under these circumstances there was nothing to be gained by pushing further north, so the captain returned to Vardö to report, before proceeding to the eastward.

Captain Broekhuysen, in the beginning of August, found a great accumulation of ice still before the southern straits into the Kara Sea, in consequence of the same northerly gales. He was unable to get through it. Only one steamer succeeded in passing the Waygat in August. She found the condition of the Kara Sea to be the same as it was in 1879 and 1880. But she was unable to return by the Matyushin Shar. Coasting the broad ice-field which rested on the east coast of Novaya Zemlya, she came out through the Waygat on September 12th.

The *Willem Barents* proceeded from the southern straits to the Matyushin Shar, along the west coast in open water, without seeing ice. There was an ice barrier across Matyushin Shar; so she returned and went northwards towards the Orange Islands. But she was stopped by the ice at Cape Maurice, in the end of August. Being still unable to enter the Kara Sea, the *Willem Barents* went north along the eastern ice, on the meridian of 65° E., as far as 78° N., where the southern ice-limit was found. The edge was followed closely to 45° E., without finding any opening. In 33° E. the edge of the ice was met with in $76^{\circ} 30'$ N., in the same latitude as it had been left in 45° E., when a gale of wind from S.S.E. compelled them to leave the ice. From this point the *Willem Barents* returned to Hammerfest.

With these few facts before me, and assuming that Mr. Leigh Smith attempted to reach Franz-Josef Land, he probably expected that the same gales which blew the ice into the Spitzbergen Sea, would also have blown it away from the south coast of Franz-Josef Land. In this expectation he must have been disappointed, as up to the 8th of July he had not found an opening in the ice. After searching for such an opening during one month, he may have proceeded to the west ice, or have taken a look at the east coast of Spitzbergen. Probably, however, he went straight towards 55° E. long. and 76° N., the point where he succeeded last year, and it may be that he found open water, at the moment, and was afterwards closed in. In that case he may have selected good winter quarters, either in Eira Harbour or some other spot, or he may be beset in the ice, like the *Tegethoff*, and be drifted towards an unknown region.

The possibility that the explorers may be so situated, either in Franz-Josef Land or in the pack, is a sufficient reason for sending out an expedition for their relief.

[For the discussion on the two preceding papers, *vide* Report of the Evening Meeting, p. 49 *et seq.*]

GEOGRAPHICAL NOTES.

Mr. Leigh Smith.—The deputation announced in another part of the present number as appointed to wait on the First Lord of the Admiralty to urge the necessity of a Government expedition for the search and relief of Mr. Leigh Smith, fulfilled their mission on the 20th ult. The Earl of Northbrook and other Lords received the deputation, which consisted of Lord Aberdare, Lord Houghton, Lord Arthur Russell, Sir Henry Rawlinson, Admiral Sir E. Ommanney, Sir George Nares, Sir Allen Young, Mr. T. V. Smith, Mr. W. Grant, Mr. S. P. Low, Mr. James Lamont, and Mr. C. R. Markham.—Lord Aberdare, after introducing the deputation, stated the facts which made relief urgent, and which justified the application to the Government. After referring to Mr. Leigh Smith's previous career, his services to geographical and physical science, and the large outlay incurred by him, Lord Aberdare submitted reasons for the belief that Mr. Leigh Smith had reached Franz-Josef Land, that he had intended to return last October, that his provisions were not calculated to maintain his crew through a second winter, and that it would not be safe to depend upon his extricating himself from his winter quarters next year without external aid. He strongly insisted on the fact that Mr. Leigh Smith was engaged in doing that very work for the promotion of knowledge in geography and natural science which the British Government had repeatedly recognised to be a part of its duty as representing a great maritime people.—Lord Northbrook and Sir Cooper Key entered minutely into the subject with the deputation.—Mr. T. V. Smith was able to give full information both as to his relative's supplies and his intentions; while Mr. Grant, who had accompanied Mr. Leigh Smith in his successful expedition of 1880, in answer to many questions put to him, gave much useful and important information as to the character of the sea and ice-fields adjoining Franz-Josef Land.—The interview lasted for an hour and a half, and Lord Northbrook, after fully admitting the value of Mr. Leigh Smith's scientific services, reminded the deputation that the subject was one to be decided not by the Admiralty, but by the Government, and undertook to give the application thorough consideration by his department, and then to submit it in all its bearings to the decision of the Government.

With regard to the present position of the *Eira*, information received a few days ago from Tromsø by Sir Henry Gore Booth seems to make it highly probable that Mr. Leigh Smith reached Franz-Josef Land. Captain Isaksen of the *Prøven*, one of the Norwegian ice-traders who had seen the *Eira* off Novaya Zemlya early in July, had supplied the following information to Sir Henry's correspondent:—"At the end of June the pack-ice lay compact six miles from the coast; further north it stretched at least 15 to 20 miles from it. The ice appeared just the

same as in 1878, when he was in those latitudes, the same year that the *Vega* started on her voyage round Asia. On the 8th of August he found no ice along the coast. August 16th he was about 20 miles north of Novaya Zemlya without observing any ice, but met with a very rough sea from north-east. When the ice commenced disappearing at the end of July, it went so suddenly that he could not understand what had become of it; he therefore supposes that in August there was open water up to Franz-Josef Land. If the *Eira* had not got into the pack and stuck fast in the month of July, he feels certain that she has reached Franz-Josef Land unhindered. His meeting with such a high and rough sea from north-east, north of Novaya Zemlya, strengthens his belief."

News of the 'Jeannette.'—On the 20th ult., the unexpected but welcome news was received in London by telegraph of the arrival of a portion of the crew of the *Jeannette* at the mouth of the Lena. According to the message received from Mr. Melville, chief engineer, the *Jeannette* was crushed by the ice on the 23rd of June, in lat. 77° and E. long. 157° , all aboard escaping in three boats and making for the mouth of the Lena, where two out of the three arrived in the latter part of September. Of the fate of the third boat nothing was then known. The telegram states that Captain De Long and Mr. Ambler, surgeon, with other members of the expedition, had been left in a state of great suffering, whilst two of the seamen proceeded to the nearest Russian settlement up the Lena to procure succour. Further details are anxiously expected.

Ice in the Barents and Kara Seas in 1881.—From a careful comparison of the reports of Norwegian walrus-hunters it appears that in May, and up to the middle of June, the edge of the ice extended in an east and west direction at a distance of only 60 to 100 miles from the coast of Finmark. It then trended north-eastward towards Novaya Zemlya, and swept round at a distance of about 30 miles from Matyushin Strait, towards the entrance of the White Sea. At this time the ice lay nearer the northern coast of Norway than is known to have been the case within the memory of man—the year 1867 perhaps excepted. Isaksen, of the jagt *Prøven*, reports that in the middle of August Matyushin Strait was completely blocked. But, as stated in a previous paragraph, the ice then disappeared off the coast, and he considered there was open water right up to Franz-Josef Land. Sevaldsen, of the *Lyna*, also states that on the 10th of September, there appeared to be open water to the northward of Matyushin Strait. The collective evidence shows that the prevailing northerly and north-westerly winds of last winter packed the ice in a broad belt across the Spitzbergen and Barents seas. The southern edge of this belt was exceptionally low down along the north coast of Norway, while the northern edge nearly reached the south point of Spitzbergen. The southern pack-edge showed little alteration during

May and June, but gave way rapidly when it fairly began to melt—about the beginning of July—as the ice was on the whole of no great thickness. The climatic conditions north and south of the belt seem to have differed considerably during the winter. In the north of Norway heavy falls of snow were unusually frequent, while north of the belt the fall was comparatively slight. So early as the end of June the winter snow had in great measure disappeared even from the highlands of Spitzbergen and Novaya Zemlya, while in the northern part of Norway it lay thickly, down to the very water's edge. On arriving at Spitzbergen the walrus-hunters also found vegetation unusually far advanced. Thus since large masses of ice were blown southward during the winter of 1880-1, it is highly probable that the Polar regions were fairly free from ice early in the summer, while the autumn must have offered exceptionally favourable conditions for an advance to the northward or north-eastward. This supposition is strongly confirmed by reports from the walrus grounds northward of Spitzbergen. With regard to the Kara Sea, it seems that it was not accessible from the westward till about the beginning of August. But while a heavy solid pack extended northward from the Kara Strait along the east coast of Novaya Zemlya, the eastern part of the Kara Sea was certainly free from ice by the beginning of August, and very probably by the middle of July. In August and September, therefore, vessels from Europe could undoubtedly have reached the mouth of the Yenisei.

Mr. Schuwer's Expedition to Central Africa.—We have received later news of the progress of Mr. Schuwer in his adventurous attempt to penetrate Central Africa from Fadassi, south-west of Abyssinia. He started from that place on a reconnoitring trip on the 30th July last, and reached the country of the Légha Gallas, near the source of the Jaboos river. From the summit of a pass in the watershed between the tributaries of the Blue Nile and the Sobat he beheld, far away to the south-west, the great lake and river Baro, flowing towards the west, and found them situated one degree further south than they are placed (on rumour only) by Petermann (Stieler's Atlas, No. 70). To the east rises the peak Wallel to the height of 11,000 feet. The Légha Gallas are an isolated tribe of this powerful race, inhabiting a country far to the westward of the Galla country proper. They are, politically, strongly constituted, under an ancient and respected dynasty, and muster at least 20,000 warriors. Mr. Schuwer returned to Fadassi, and proposes to make a final start south at the end of the year.

Recent News from the Congo.—We gather from papers with which we have been favoured by the Secretary, that reinforcements for the Livingstone (Congo) Mission Expedition to Stanley Pool have arrived at Banana, on the Lower Congo, and that as soon as the necessary carriers can be obtained, two new stations will be formed, one between Man-

yanganga and Stanley Pool, and the other at the Pool itself. These will complete the chain of stations through the cataract region, and bring the expedition to "the entrance gate of that far-reaching water-way into the vast unexplored interior, the Upper Congo." In order to make proper use of this means of access to the heart of the continent, it was obvious that a much larger steamer would be needed than the *Livingstone* steam-launch lately sent out for use on the Lower Congo, and most opportunely a letter has been received from the widow of Mr. Henry Reed, of Tasmania, who was greatly interested in Africa, offering to present just such a steamer as is wanted, and which will be named the *Henry Reed*.—The Mission has sustained a severe loss in the death of the leader of the pioneer party, Mr. Adam McCall, which took place at Madeira on the 25th of November, when on his way home. The cause of his death appears to have been, not African fever, but acute inflammation of the liver, partly the result of his previous journeys in South Africa. When he left for the river Congo, in 1880, to take charge of the Livingstone (Congo) Inland Mission Expedition, our Council granted him a loan of instruments,* and he hoped to have been able to do good geographical work in the interior—a hope which has unfortunately been frustrated by his premature death at the age of thirty-one.—The Baptist Missionary Society have received intelligence that a station has been founded at Manyanga, near the Ntombo Falls, by Messrs. Bentley and Grenfell, who started from Isangila with twenty-seven men, on August 12th, and after a rapid march through the Basundi district, reached Mr. Stanley's depôt near the Ntombo Falls on August 18th. The site for the station is separated by a small brook, with good water, from the Belgian post, which is placed on the top of an isolated hill, 250 feet high. The natives are most friendly and well-behaved, and are a remarkable contrast to their neighbours, the Basundi. Mr. Grenfell remarks that, although the journey to Manyanga through the Basundi country may be quickly and successfully made, it is not a feasible route for the regular transmission of supplies. He and his companion had had some experience with several types of the native races, but had never before met with such people as the Basundi; when encountered in small parties, they run away and hide; but when they are in large numbers, they rob the traveller in the most barefaced manner, and laugh when the theft is brought home to them. Nothing is safe, from bales of cloth to the covers of cooking utensils. The water-way between Isangila and Manyanga, though a bad and dangerous one, must be used, if up-country stations are to be maintained.—At Manyanga, Messrs. Bentley and Grenfell met Père Augouard, who was on his way back from Stanley Pool. He reported that the chief of Nshasha, in conformity with M. de Brazza's instructions, was willing to allow him to build there, as he was a Frenchman, but that a determined resistance

* See vol. ii. p. 413.

would be made by the people (on the south bank) to the settlement there of persons of other nationalities. Mr. Stanley reached the Pool a short time before Père Augouard, and tried to make arrangements for a station on the south bank, staying in the meantime with his old friend Nga Liema. At the time Père Augouard left, he appears to have been unsuccessful, but the work of carrying up boats and stores for him was still going on.

French Surveying Expedition in West Africa.—It had been intended that active operations should have recommenced early in the season of 1881-2, but owing to the prevalence of yellow fever in the Senegal region it was not deemed advisable to despatch the large staff required for the construction of the new post beyond Kita, and for the formation of an establishment on the Niger. The epidemic, however, has been for some time abating, and it was hoped that something might be done during the autumn. Colonel Berguis-Desbordes, the commander of the expedition, accordingly left for St. Louis on September 20th, and Dr. Martin-Dupont started on October 5th, while the remainder of the party, which was smaller than originally intended, followed on October 20th. Colonel Berguis-Desbordes and Captain Archinard intend to establish their headquarters at Khay, below Medina, on the Senegal, which they reached in a steam despatch-boat on November 10th. This place is to be the starting-point of the railroad, and a few miles of the line are at once to be made in the direction of Bafulabé. Captains Henry and de Gasquet will be engaged in carrying out geodetical work, while M. Arnaudeau, an engineer, with his staff, will settle definitely the route which the line is to follow. Captain Delanceau, accompanied by three officers of the Marines, has been ordered to undertake the exploration of the course of the river Bakhoy.

Mr. O'Neill's Journeys in the Interior of Mozambique.—Our Associate, Mr. H. E. O'Neill, Consul at Mozambique, has been recently engaged in visiting different parts of the little-known region bordering the Portuguese territory in this part of Africa. In July last he made an interesting trip to the river Angoche, about 90 miles south of the Port of Mozambique, where the Portuguese have established a new settlement, on the northern bank, called Parapato; the old capital of the district, named Angoche, which he also visited, being situated on an island some distance up the river. He reports the existence of an extensive trade on the river, in cultivated products, viz. amendoim, calumba-root, and gergelim, besides indiarubber and ivory, and states that there are no less than thirty-three trading houses of Banyans, Battias, and Hindus at the town of Angoche.—Since then Mr. O'Neill has undertaken a longer journey of exploration in the interior, in the direction of the important but to geographers little-known Arab trading route, extending from Kisanga, opposite the island of Ibo, to the eastern and southern shores of

Lake Nyassa. He says this route is considerably shorter than that followed by Livingstone and Bishop Steere, and other English travellers, *viâ* the Rovuma. This road branches at a point called Mwalia, the residence of a powerful Makua chief, some seven days' journey from the coast, one branch—the most used—going to Matarika's, joining there the Kilwa-Nyassa route, and the other striking more southerly. It was this latter route that Mr. O'Neill set out in September to examine. On September 10th, when we last heard from him, he was at the town of Gavala, 110 miles W. by N. $\frac{1}{2}$ N. of Mozambique. The country for the first forty miles of his march from the coast at Mokambo Bay he describes as thinly timbered with thick undergrowth, including quantities of the indiarubber vine, fairly cultivated, and populous. The country then becomes rocky and broken, with hills and peaks of bold shapes and precipitous sides, from 200 to 1000 feet in height. At the 142nd mile of his march he speaks of coming into view of the exceedingly beautiful Shalawe plain, which, dotted with villages, stretches away for many miles to the west and south, where the vista terminates in a range of splendid hills 2000 to 4000 feet high. He here heard of the startling phenomenon (for this part of Africa) of snow-clad peaks, situated six or seven days' journey to the west. These he intended to make an effort to see. We are promised a detailed account of this remarkable journey, with a map, soon after the adventurous traveller's return to Mozambique.

Lake Source of the Lujende River.—The Rev. W. P. Johnson, of the Universities Mission in the Rovuma country, has recently made an interesting journey to the lake reported by the natives to exist in the mountains at the source of the Lujende branch of the Rovuma. He informs us by letter that in walking along the trade route from Mwembe to Mponda (near the outlet of the Shiré from Lake Nyassa) he diverged from the road for the purpose of visiting the rumoured lake. The path was well marked as far as a place called by the Yaos Chilwa. Here in August he came in view of a large lake with a few islands in it, and grass-grown margins swarming with hippopotami and water-fowl. Reaching its banks he could see it stretching away to the south-east, the lofty hill Mangoche (near Nyassa, east of Mponda) being visible at the same time to the north-west. He traced the lake shores [northward?] during one day's march, to a point where it narrowed, and continued another day and a half to the town of Amaramba on the Lujende, whence he followed the latter river to near Mwembe. He supposes the lake he has seen to be the Lake Shirwa of Livingstone, the northern part of which had never before been visited.

Death of Dr. Krapf.—This learned and devoted missionary labourer in East Africa died on the 27th of November last, at Kornthal, in Germany, in the seventy-first year of his age. His name is well known to readers of books of African travel from his popular work published

in London in 1860, entitled 'Travels, Researches, and Missionary Labours during an Eighteen Years' Residence in Eastern Africa,' in which the first detailed account of snow-capped mountains in Equatorial Africa was given to the world. He devoted especial attention during his long residence in the various countries of that part of Africa to the native languages, and published on the subject numerous treatises—translations, vocabularies, and grammars. The scene of his early labours, from 1837 to 1842, was Abyssinia and Shoa, and the fruit of his studies there was a revision of Abu Rukh's Amharic translation of the Bible, a work at which he laboured many years, but which has only recently been published, namely in 1879. At various dates throughout his long career he compiled and published vocabularies of six other East African languages, besides translating portions of the New Testament into many of them, including the idioms of the Galla, Wanika, Wakambani, and Suahili peoples, and editing similar works compiled by his colleagues Rebmann and Erhardt. Krapf was the first European to visit (in 1848) the interesting country of Usambara. Kilimanjaro was discovered by Rebmann on his visit to Chagga in the same year. He finally returned to Europe in 1854.

REPORT OF THE EVENING MEETINGS, SESSION 1881-82.

Second Meeting, 28th November, 1881.—The Right Hon. Lord ABERDARE, President, in the Chair.

PRESENTATION.—*Dr. Thomas Colan, R.N.*

ELECTIONS.—*John Barker, Esq.; John Warren Barry, Esq.; Geo. S. Boulger, Esq.; Hon. Algernon Bourke; Robert Bradford, Esq.; George Brown, Esq.; Durrant E. Cardinell, Esq.; John M. Chamberlain, Esq.; Jos. John Chapman, Esq.; William Chapman, Esq.; Lt.-Col. J. Menzies Clayhills; Dr. Thomas Colan, R.N.; A. R. Colquhoun, Esq.; Harvey T. B. Combe, Esq.; Walter Coote, Esq.; Charles Stewart Cox, Esq.; Wm. James Craig, Esq.; Rev. Henry Woodward Crofton; Jos. Henry Dineen, Esq.; Wm. Thos. Dunlin, Esq.; Lieut. Frederick Elton, R.N.; Arthur Flower Ellis, Esq.; General Sir F. P. Haines; Holt Sam. Hallett, Esq.; James Henry Houghton, Esq.; Fred. H. Houston, Esq.; Jasper Wilson Johns, Esq.; Charles Johnson, Esq.; Francis Edward Joseph, Esq.; Capt. R. D. King, R.N.; Samuel Gerrard Kirchhoffer, Esq.; Edward Tyrrell Leith, Esq.; The Earl of Mayo; Rev. J. Milum; Arthur Duff Morrison, Esq.; Charles Morrison, Esq.; Thos. Wm. Hy. Oakley, Esq.; Henry Edwd. O'Neill, Esq.; Albert F. Ortlepp, Esq.; Major-General Chas. Pasley, R.E.; Frederick L. de Pass, Esq.; J. J. de Pass, Esq.; Ellis Pearson, Esq.; Lieut. George Pirie, R.N.; Henry Power, Esq.; Dr. Jas. R. M. Robertson; A. Condie Stephen, Esq.; H. Cockburn Stewart, Esq.; Watson Surr, Esq.; Il Principe di Teuno; William John Turner, Esq.; Albert Watkins, Esq.; Edmund Watt, Esq.; John Henry Wilkinson, Esq.*

The following paper was read:—

"Lake Tanganyika." By E. C. Hore. *Vide ante*, paper and discussion, p. 1.

**Third Meeting, 12th December, 1881.—General Sir H. C. RAWLINSON,
K.C.B., Vice-President, in the Chair.**

PRESENTATION.—*The Rev. J. Milum.*

ELECTIONS.—*Alex. Wm. Anderson, Esq.; Arthur Charles Cork, Esq.; H. Arthur Erbebach, Esq.; Rev. John Greenfield, D.D.; Henry Currier Langton, Esq.; T. V. Smith, Esq.; Alfred John Teal, Esq.; George Vale, Esq.; Edward Wahab, Esq.*

In opening the business of the meeting, the Chairman (Sir H. RAWLINSON) expressed the pleasure he felt in having been invited to preside on the present occasion, in the absence of Lord Aberdare, because the papers referred to Arctic subjects, with which he had been closely connected in former years, when he had the honour of presiding over the Society, and in which he had ever since felt the liveliest interest. Before proceeding to the papers, however, he would read a note that had been received from Sir Richard Collinson referring to the death of Admiral Bird, a very distinguished Arctic traveller, who, although not a member of the Society, had left his mark in the annals of scientific discovery:—"Admiral Bird accompanied Sir Edward Parry in all his voyages. He was Sir J. Ross's first lieutenant in the *Terror* on the memorable Antarctic voyage, as he had accompanied Sir James as second in command in the remarkable boat voyage from Spitzbergen, when the highest northern latitude was reached. He and Sir James were the two individuals who attained the distinguished honour of having approached the nearest to both poles. His last employment was in command of the *Investigator*, in company with the *Enterprise* under the charge of his old companion and chief Sir James Ross, in search of Sir J. Franklin in 1848. It was my fortune for some time to be a shipmate with Admiral Bird, and I can bear testimony to the respect and esteem with which he was looked up to by all who had the pleasure of his acquaintance; and on my assuming the command of the *Enterprise*, in 1849, I received valuable and important advice from both Sir James and himself."

The papers to be read related to two Arctic expeditions, one American and one English, both of which, it was to be feared, were at the present time exposed to very great peril in the Northern Seas. At any rate, those expeditions were now attracting a very large share of public attention and sympathy. He had hoped on this occasion to be supported by his Excellency the American Minister, but at the last moment urgent matters had prevented his being present. Mr. Gordon Bennett also had intended to be present, but he too had been detained by urgent business. Mr. Bennett was the gentleman who at his own risk and expense fitted out the *Jeannette* expedition. But although the Meeting was deprived of the pleasure of seeing those two distinguished gentlemen, the Netherlands Minister was present, representing a nation famous in the annals of Arctic discovery, more especially of late years, as they were accustomed to send out an expedition every year into the Barents Sea. Mr. Leigh Smith's cousin, Mr. T. V. Smith, was also present, whose letter to the newspapers had no doubt been read by all the members. He took the opportunity of mentioning the pleasure that all geographers felt in seeing how the great maritime Powers in all matters of Arctic discovery went hand in hand, acting in a spirit of honourable rivalry, but without anything approaching to a feeling of jealousy. In reality it made little difference whether an expedition was commanded by a British, American, Swedish, Danish, or Dutch navigator. They were all actuated by the same spirit, and while as geographers they mainly wished for the improvement of science, as men they desired that some relief should be sent to the crews who were beset amid the icy horrors of the Arctic seas.

Mr. MARKHAM then read his paper on "Measures for the Search and Relief of the United States *Jeannette* Arctic Expedition" (*ante*, p. 28).

Lieutenant HØVGAARD then read the following memorial to the President of the Royal Geographical Society on the subject of his projected *Jeannette* Search Expedition to Cape Chelyuskin.

"LONDON, 10th December, 1881.

"On the 8th of July, 1879, Captain De Long sailed from San Francisco, and in the middle of August he passed through Behring Strait. On board the *Jeannette* were 31 men and 76 dogs, and the vessel was fully provisioned and equipped for three years. On the 29th of August, Captain De Long sent his last letter home from Serdze-Kamen, and then expressed his intention of proceeding to Wrangell Land via Koliutschin Bay. This is the last authentic news we have of the expedition.

"Rumours have since reached us, but they are both vague and contradictory. The earliest was, that Captain Barnes, of the whaler *Sea Breeze*, had seen the *Jeannette* on the 2nd September, 1879, about 50 miles south of Herald Island, and in the evening of the following day several other whalers had seen the smoke of a steamer close to the west of the island, and they thought that the steamer in question was making for Wrangell Land.

"We now know that Wrangell Land is an island, and, as it appears, a small island; it is generally considered to be impossible to penetrate through the closely packed Polar Sea without following a coast-line, De Long must therefore have sought another basis for his operations than Wrangell Land, which, when he sailed, was supposed to extend far to the north, and was therefore considered to be a favourable line to follow.

"We can only, in forming a judgment of the probable route of the *Jeannette*, consider what appears most probable. To me it appears very improbable that De Long has sought to proceed north-east, or in a direction where the American Polar Sea would have been his retreat. These regions are so well known and present such great difficulties, that he could scarcely expect to be successful in that direction. Where the various Franklin expeditions from the Pacific Ocean for many years have met an impenetrable ice-barrier, and where whalers year after year have followed the edge of the pack and never reached higher than about 73° N. lat., it will be most impracticable to attempt to proceed north, and as Mr. Gordon Bennett said to me the other day: 'De Long can never have gone north-east, he would have committed the greatest blunder imaginable in doing so.' Besides, I am of opinion, that in case he had done so we should have heard from him long ago, because he could not have made great progress in that direction, and if the ship had been beset by the ice the crew would after one winter have left the ship, and with their splendid equipment have reached some inhabited parts long ago.

"I therefore dismiss the idea of his having gone north-east. It is more probable he has gone direct north, but even in this direction he could have made but little progress, as the whalers report that the Polar pack, in the beginning of September 1879, came drifting south in great masses. There is therefore only the western route left.

"My supposition has been formed partly from the conclusions I have drawn from the results of former voyages in these regions, and has partly been influenced by two rumours which have come to our knowledge this autumn. On the 13th of September, 1879, a Yakut saw the smoke of a steamer off the mouth of the river Lena, and another report speaks of two bodies of white men having been found during the winter 1880-81 at the mouth of the Yenisei.

"I have recently asked Professor Nordenskiöld if he considered these rumours to be at all worthy of credit, and I understood from him that he saw no reason to doubt them, although he had had no time to investigate them fully.

"With regard to the first rumour, we must not, as Professor Nordenskiöld said,

be too exact with regard to the date, and there is no reason why the *Jeannette* should not have been able to accomplish the distance between Wrangell Land and the Lena (in a straight course about 1000 miles) in the above-named period, particularly if the Yakut had fixed the date a little too early, which I do not consider improbable, as they often pass a couple of days in sleeping off the effects of a day's hard drinking.

"I consider it most probable that De Long has, in proceeding north, met with the unbroken edge of an impenetrable pack, and has followed it westwards. On board the *Vega* we saw, during the whole of our passage along the eastern part of the north coast of Asia, the pack to the north at a few miles' distance from the shore. This distance may of course vary, and De Long may possibly have found it greater than we did, and thus been able to proceed in a more direct course for the New Siberian Islands, which may explain the short time he took to reach the Lena.

"I believe, from what I have seen, that he has found the edge of the pack so unbroken, that the attempts he may have made to penetrate north have been of such a short duration that he may easily have accomplished the 1000 miles in a fortnight, particularly if we bear in mind that the *Vega* reached Cape Schelagskoi from the New Siberian Islands in six days (Cape Schelagskoi being only about 250 miles distant from Herald Island), and this though we occupied thirty-six hours in attempting to proceed north-east in the close pack-ice off the Bear Islands.

"Supposing that De Long really was off the mouth of the Lena, we may take it for granted that he had given up the New Siberian Islands as his starting-point for the north, and intended to proceed westwards. He will undoubtedly have found open water along the coast, and has in all probability followed this. A better and safer route up to 78° N. lat. cannot be desired than the east coast of the Taimyr Peninsula. He has consequently reached Cape Chelyuskin, and from this point I am of opinion that he for various reasons has shaped his course to the north. Before I proceed further in explaining this supposition, I will dwell for a moment on the other rumour about the two bodies found by the Yenisei.

"We know for certain that in 1880 no European or American was missing from any of the whalers in the western part of the Siberian Polar Sea. It is not likely that the bodies would have drifted down the river from the south, as this must have taken place on the breaking-up of the ice in the spring of 1880, and it is scarcely possible that the bodies would still be found on the shore in the course of the winter of 1880-1. They would undoubtedly have been devoured by bears or birds of prey in the course of the summer.

"This rumour may, however, be entirely false; but supposing that the bodies really have been found, we have here again a trace of the *Jeannette*, and it is also a certain proof of the *Jeannette* having been in the neighbourhood of Cape Chelyuskin. We must suppose that the two men have attempted to reach some inhabited place, and, of course, by the shortest possible route, and the spot on the north coast of Asia, where they have commenced their journey, must consequently have been nearer to the mouth of the Yenisei than to that of the Lena; in other words, not far east of Cape Chelyuskin. With regard to the fate of the *Jeannette*, we have no reason to fear the worst, even if the two men did belong to her crew. They may, for some reason or another, have been sent ashore before De Long left the coast of Asia. At all events I am convinced that De Long has left a record at some place in the neighbourhood of Cape Chelyuskin, and I take it for granted that it will be considered worth while to go in search of these documents, and then proceed further north in search of the ship.

"But although many attempts have been made during the last two summers to bring succour to the *Jeannette*, and to get news of her, no effort has been made in the regions I have just referred to. In 1880 the *Corwin* tried in vain to find some trace

of the expedition north of Behring Strait. In 1881 the *Rodgers* and *Corwin* again penetrated into the Polar Sea north of Behring Strait, but without any result. The *Alliance* and *L. P. Simmonds* have been in search around and to the north of Spitzbergen, the *Eira* and *Roswell King* about Hudson's Bay, and finally the *Proteus* has not succeeded in finding any trace of the missing ship in the neighbourhood of Lady Franklin's Bay.

"In 1882 another attempt will be made from Lady Franklin's Bay to find the *Jeannette*, and the *Rodgers* will proceed by way of Behring Strait to the eastern part of the Siberian Polar Sea. In addition to these expeditions I purpose examining the western part of the Siberian Polar Sea, with Cape Chelyuskin as the possible starting-point for the north, following, if possible, in the track of the *Jeannette*.

"I would leave Denmark in the last days of June, and proceed through the Yugor Strait into the Kara Sea, which I am convinced is navigable every year, if we await the breaking-up of the ice in the straits. A channel will then be found along the coast, and in this channel the Polar pack cannot enter, on account of the shallow water. The deeper part of the sea must be avoided, as large masses of ice from the Polar Sea are often found there. The Malygin Strait is very early free from ice, on account of the warm waters from the Obi river; and having reached the Gulf of Obi, no further difficulties need be feared. By inquiring amongst the Samoiedes, some information may possibly be gained which may lead us on the track of the *Jeannette*. If no information can be got, I purpose following the coast, and landing at all conspicuous places where there is any probability that cairns could have been built. I expect to reach Cape Chelyuskin at the end of August. If no trace is found in this neighbourhood, I intend, if the circumstances are favourable, to shape a course for the north, and it appears to me that land may here be found at no great distance from the coast of Asia, possibly even a coast-line trending in a northerly direction.

"We know that a deep channel is found between Novaya Zemlya and Franz-Josef Land extending southwards. Along the eastern coast of Novaya Zemlya we find this deep-water channel extending far into the Kara Bay, but eastwards no such deep water has been met with. To the north, off the mouth of the Pjassina river, so much as 100 fathoms' depth of water is not found up to 78° N. lat. In the Taimyr Bay no great depth of water is to be found, so I conclude that Franz-Josef Land extends far eastwards in close proximity to Cape Chelyuskin. East of this promontory we found, during the voyage of the *Vega*, 70 fathoms of water, although we sailed very close to land, from which fact we may be led to conclude that there is a larger sea to the east, or perhaps to the north-east, and it is therefore possible that the coast-line of Franz-Josef Land at this point turns towards the north.

"Assuming that De Long has reached this land, and is in want of succour, I intend to search for him in this direction, and bring him assistance. If I succeed in collecting sufficient funds for two winters, I will attempt to reach the supposed land to the north, and in this case it will be impossible to form any further plans beforehand. If I, on the other hand, only receive funds for an expedition of a year and a half's duration, I consider it advisable, after having made a reconnaissance to the north, to go into winter quarters in Vega Bay, near Cape Chelyuskin, and then confine the search to making excursions by sledges in a northerly direction. As, in the above case, I shall only be equipped for a period of a year and a half, and the object of the expedition is to render assistance, it would not be advisable to proceed too far with the ship; for I should then run the risk of falling short of provisions, and thus be unable to render any assistance to the *Jeannette* if we should meet with her, and find she was in distress.

"But even if the expedition is limited to one winter near Cape Chelyuskin,

there will be plenty of work to do. If no trace of the *Jeannette* has been found up to that time, I intend to explore the coast eastwards with dog-sledges in search of her or any documents she may have left. I would next take a series of physical observations at Cape Chelyuskin, which will be of the greatest importance, particularly during the time when observations are being taken at the international stations round the North Pole. The autumn will be used for preparing for these observations, in building observatories, &c., and by aid of boats and sledges in reconnoitring northwards.

"The dark time of the year will be used for the observations, and in March I intend proceeding with a sledge expedition to the north. As I may meet with open water in the ice, especially on the return journey, I believe it would be practicable to make use of a sledge-boat something similar to Parry's; but, according to a suggestion I have received, this can be built much lighter in case the expedition consists of only eight men.

"If land be not found very near Cape Chelyuskin, there will be no possibility of establishing any depôts, and I could then only be absent from the ship for fifty days unless a party accompanies me part of the way. It depends, however, greatly upon the funds placed at my disposal, whether I shall be able to take a sufficient number of hands with me for this purpose.

"You will understand, my Lord, that it is impossible to lay down a detailed programme for a search-expedition, as everything depends upon the place and time where a trace may be found of the missing ship. We may find no trace, and the *Jeannette* may arrive in good condition in the Pacific or Atlantic Ocean next summer, but it is also very probable that she is in such a situation that assistance and succour would be much needed, and this is what I hope to convey to her.

"For this object, I now appeal to the President and Council of the Royal Geographical Society for such assistance as they may feel able to grant.

"FREDK. HOVGAARD, Lieutenant Royal Danish Navy."

Commodore JANSEN's paper was next read by Mr. Markham on "The Dutch Arctic Voyages of 1878, 1879, 1880, and 1881, and the probable position of Mr. Leigh Smith" (*ante*, p. 35).

The following discussion upon the above-mentioned papers then ensued:—

Sir GEORGE NARES said that, while they all admired the persistent endeavours of the Dutch naval officers to increase our knowledge of the Barents Sea, they must be convinced that navigating through the ice in that sea was a very uncertain proceeding. He quite agreed with Commodore Jansen that it was very different from the navigation of Baffin's Bay, and it was for this reason that he, in common with all Arctic authorities, was anxious about the welfare of Mr. Leigh Smith and his companions. But while feeling anxiety, and arguing that relief should be sent to him, he in no way supposed that he was undergoing more than ordinary Arctic dangers, and the ultimate safety of the expedition might be firmly relied on. Mr. Leigh Smith was too experienced an Arctic navigator to deliberately contemplate spending a winter in the ice without having laid in a stock of provisions to last till September 1883. Yet they were distinctly informed that he was only provisioned till the summer of 1882. Therefore he (Sir George Nares) joined with Commodore Jansen in concluding that some accidental circumstance had prevented his returning home this year. That being granted, they had to consider his chance of escape next season. The paper which had just been read showed how little was known of the Barents Sea. If the *Eira* were beset in the ice, it was uncertain whether she would drift out to the north-west, between Franz-Josef Land and Spitzbergen, in the way that he thought the icebergs born in Franz-Josef Land disappeared; or with the

surface ice towards the south of Spitzbergen to the Bear Islands and Thousand Islands; or towards Wyche's Land, where eddy currents locked in the ice for long periods. On the other hand, if it were supposed that he had gone into winter quarters in Franz-Josef Land, the many uncertainties attending ice navigation through that sea, as explained in the voyages of the *Willem Barents*, must be taken into consideration. As a striking instance of the uncertainties of Arctic voyaging, he would remind them that in 1853 there were no less than three different expeditions, with five ships, engaged in the search for Sir John Franklin. Those three expeditions were in different seas, and endeavoured to return, but they all got beset in the ice, and had to wait till the next season. Sir Richard Collinson was off the Mackenzie river on the North American coast; Sir Edward Belcher, Admiral Richards, and Captain Osborne, in the *Assistance* and *Pioneer*, were in Wellington Channel; and Admiral Kellett and M^cClintock were in Barrow Straits in the *Resolute* and *Intrepid*, with the sick crew of the *Investigator* on board. In 1873, Lieutenant Payer and his companions in the *Tegethoff* were locked up in the same sea where Mr. Leigh Smith now was; and in 1874 they were obliged to abandon their ship before the season broke up. Taking all these facts into account, he found himself unable to join in the responsibility of advising that Mr. Leigh Smith should be left next season to his own resources. On the contrary, he was of opinion that such assistance as could be provided should be sent out next year, before it was too late. If Mr. Leigh Smith was in distress, they would have the satisfaction of having done all they could to help him; if, on the other hand, as they all hoped, he made his way south after a successful voyage, they would receive him as he deserved. An important question, however, remained for decision. Was the present case one for national relief? It was evidently very unreasonable to lay down the rule that all explorers who, with their lives in their hands, penetrated into an unknown country, or a frozen sea, should be followed by a national expedition; but there were special exceptions, and if all authorities agreed that Mr. Leigh Smith and his comrades would be in danger if they did not escape next year, he felt convinced that the nation would unanimously agree that succour should be sent to him. As to the nature of the relief, provisions should be sent especially to Eira Harbour. To reach that position it would probably be necessary to force a way there. It was an entirely different undertaking from determining the edge of the ice, as in the case of the *Willem Barents*, and was too dangerous a service to be entrusted to irresponsible control. If undertaken at all, the vessel, officers, and crew should be under responsible authority, and that could only be secured by the Government taking the matter in hand at the request of the nation.

Sir ALLEN YOUNG said he heartily endorsed everything said by Sir George Nares, and agreed with him that if an expedition was sent out it should be under the authority of the Government, and entrusted to a responsible officer who would carry out such instructions as he received for endeavouring to relieve Mr. Leigh Smith, who was known to be missing, but who, from the nature of his voyage and the uncertainty as to his provisions, was at present a source of great anxiety to his friends, and especially to Arctic explorers. It appeared that the last seen of him was off the Matyushin Shar; he was then proceeding north. It might be inferred that he had found himself in a similar position to the Austrians, and had become involved in the pack and drifted away to the north-west. His ship was constructed and strengthened to meet the usual pressures and accidents of the ice. If he found the ice sufficiently clear he might have proceeded to Eira Harbour to follow up his previous explorations in that quarter. In that case Eira Harbour seemed to be the point to make for. If an expedition was sent out he hoped it would be a national one, with instructions to proceed to Cape Nassau, and follow up any leads in the

ice towards Eira Harbour, to see if Mr. Leigh Smith had left any instructions there. Mr. Smith ought not to be regarded as in extreme danger at the present time, but it was one of those cases of doubt in which everything should be done to prevent disaster. He (Sir Allen Young) would be the last to suggest that the ship and crew were lost, but he hoped that all would do their best to send relief. Referring to the missing American expedition, he hoped that Lieutenant Hovgaard would meet with every success in his search for the *Jennette*, and he congratulated him on his gallantry in proposing such an undertaking.

SIR HENRY GORE BOOTH said he was of opinion that if anything was to be done for Mr. Leigh Smith, it ought to be done at once, or the same result might follow as in Sir John Franklin's case. Mr. Leigh Smith had only one year's provisions with him, and although it is possible that he might get through next year, that eventuality ought not to be confidently reckoned on. Now was the time to prepare a ship for the purpose of relieving him, and he agreed with Sir George Nares that, to be successful, the ship should be under proper authority, and no one could give that proper authority except the Government. If the *Eira* was now in the pack, she was probably drifting like the *Tegethoff*. If, as in the latter case, the crew had to retire, they would have, perhaps, from 100 to 120 miles of ice to drag their boats over. Anybody who had read the history of the *Tegethoff* voyage, so ably given by Payer, could understand the difficulties and dangers that had to be gone through in dragging the boats over the pack ice. If his memory served him rightly, Payer's men in two months only succeeded in making eight miles towards the south. He quite agreed with Sir Allen Young that any ship sent out should go to the coast of Novaya Zemlya and there leave depôts at Admiralty Peninsula, Suchoi Nos, and the western Pankratjew. Cape Nassau was a spot not easily found; but the three points mentioned were prominent positions, and cairns erected there would be almost sure to attract the attention of boats. He naturally inferred that if Mr. Leigh Smith had to abandon his vessel, he would very probably follow the plan that Payer and Weyprecht adopted, and make straight for Novaya Zemlya. If he drifted to the west, he would have to come down somewhere north of Spitzbergen, where a number of walrus hunters were always pushing their way. The coast of Novaya Zemlya was not so much visited. During the whole of the time that he (Sir H. G. Booth) was in that region, he only met the *Willem Barents* and sighted three other vessels. In conclusion, he urged that this was the time to do something. If they waited another year, Mr. Leigh Smith and his companions would be starving, for there were no reindeer in Franz-Josef Land. All they would have to depend upon would be the bears, if the ice was close, and the few birds they might pick up.

MR. W. J. A. GRANT thought that the only thing to be said was that Mr. Leigh Smith must be sent for. Details regarding the search could be settled afterwards. The little experience that he had had in that way was in summer voyages from 1878 to the present year. In 1878 they found the ice in the direction of Franz-Josef Land fairly loose, but did not examine it so much as in the following year. In 1879, in the *Willem Barents*, they were able to get within a few miles of Franz-Josef Land, and there they found an open space. Mr. Leigh Smith last year, when he made his most successful cruise, was very desirous, if possible, to find whether the gap which was seen in 1879 existed in other years. The question was whether Franz-Josef Land was always attainable. Mr. Leigh Smith thought it was, and he went up in 1880 with the *Eira*, and almost on the same degree of longitude, where the gap or river in the ice leading up to Franz-Josef Land had previously been seen, he found it again. On August 13th he steamed up straight for 100 miles and reached Franz-Josef Land on August 14th. He then thought that there would be no difficulty in always reaching it, and considered that the *Tegethoff* had had an

exceptionally bad year in that quarter. Therefore this year his object was to see whether the coast-line extended further in a westerly direction or ran due north—whether it joined Spitzbergen or ran further north. He intended to reach Eira Harbour and then go north if possible. The present year had been an exceptionally bad one in most parts. As Commodore Jensen had said, when the *Willem Barents* went up, there was an enormous quantity of ice in the sea between Spitzbergen and Greenland. When they reached Jugor Straits down by the Kara Sea, there was also much ice there. They expected to reach the ice towards the end of August, but they were able to get to the north of Novaya Zemlya without difficulty. It was then determined to go westward through the loose ice and see if they could find the gap which had been found in 1879 and 1880; but they found no gap. The ice was of the same description all along. When they were well within the loose sailing ice, which was all composed of stream ice and was not very heavy, the officers of the *Willem Barents* used to ask him, "Suppose you were on the *Eira*, would you have gone north through this?" The answer was "Certainly." She would have worked her way in and nothing could have stopped her, as far as he could see, and his idea was that she had done so and perhaps reached Franz-Josef Land, there having been a prevalence of easterly and north-easterly winds which kept the streams loose. But it was possible that when she reached Eira Harbour and wanted to go out again, the streams with a stiff gale shut her in, and she would be caught there, either near Eira Harbour or else in the pack. When he was there last year, he used to say, "If we are caught now, what are we to do? We have got provisions to last till next summer; but how are we to get out? If we know that a ship will come for us, or if we thought that any one knew where we were, we might feel pretty safe for the winter; but we do not want to be caught under present circumstances." As it was, they did come out. Mr. Leigh Smith would, this year, be to a certain extent, in the same position. Personally, he would not think that any one would come for him, and would not care a bit about it. He had no fear: he thought about his crew and about everything except himself: he wanted no honour, no glory: his one idea was to make discoveries, and do useful work in the northern seas. He (Mr. Grant) was perfectly certain that Mr. Leigh Smith did not intend to winter, and that he had not provisions to last a second winter. If he was not rescued next summer or did not come out then, he would never come out at all, and if nothing was now done for him, they might afterwards have to regret it. Mention had been made of dragging the boats over the ice. The *Tegathoff* boats were small and light, like walrus-hunters' boats, and were dragged over the ice from Franz-Josef Land to a spot some 60 miles north of Cape Nassau, and two months were occupied in going eight English miles. Afterwards they got on rather faster; but the boats of the *Eira* were too heavy to be dragged a single mile. He was quite certain that it was utterly impossible to drag them over the ice. He had found it extremely difficult to drag them even over a piece of ice 100 yards broad, and how could they be taken 100 miles with provisions for four months?

Commander HULL was sorry to find himself in the position of being the only Englishman now living who had seen Wrangell Land. Between 1852 and 1881 no Englishman had passed through Behring Straits on Arctic discovery. Sir George Nares had laid before the Society a scheme for the relief of Mr. Leigh Smith, and had pointed out the manner in which it should be carried out. Fortunately, he had many pupils either in or near England who would efficiently carry out his ideas. The members of the Society were resolved that an application should be made to the Government for the relief of Mr. Leigh Smith, and no doubt Sir George Nares' able and leaderlike proposals would meet with their approval. He himself was in the *Herald* with Sir Henry Kellett and Captain Maguire. They landed on Herald Island,

and saw the high peaks of Wrangell Land. He quite agreed with Mr. Markham that the discoveries of Captain Berry in the *Rodgers* were of considerable importance. They showed that little was to be done in that direction in the way of pushing north. Captain Berry had gone further north than Sir Richard Collinson, and found no sign of land. Sir Richard Collinson's letter had made everything clear as to what might have become of the *Jeannette*. If she had not gone to the westward along the coast of Siberia, she had probably been caught in the current that set in steadily along the American continent. In that case Sir Richard Collinson had pointed out the course which might be adopted; but there was one thing which he had not alluded to. Among the natives at Point Barrow, where he (Commander Hull) spent two winters with Captain Maguire, there was a report that land existed to the north. They said that certain natives had drifted away, and seeing no chance of getting back to Point Barrow, and the ice allowing them to travel, they went on, and finally reached land. There they remained for some little time, and recruited their strength. Afterwards they returned to Point Barrow. Dr. Simpson asked them how far it was, but all the information that could be obtained was that it was very far, and that they wore out so many pair of mocassins during the journey. The *Jeannette* may drift on to this land, and her crew may retreat over the ice to the American coast, as the natives of Point Barrow have done before them. Wrangell Land was for a long time only known by report, but now it was known as a fact. It had not only been seen, but had been landed on and sailed round. With regard to the relief of the *Jeannette*, Lieutenant Hovgaard had undertaken one part with regard to the Siberian shore. There were officers in the American service at Point Barrow, and no doubt they would pass the word along that a vessel was missing, and he was quite certain that the Eskimo would render every assistance. At the same time it might be quite necessary that next year one small vessel from the Pacific should be sent up, well provisioned, to Point Barrow.

The CHAIRMAN read the following letter, which the Council of the Society had addressed to the Admiralty, in communicating Mr. T. V. Smith's memorial on the subject of Mr. Leigh Smith's relief:—

"To the Right Hon. THE EARL OF NORTHBROOK.

"1, SAVILE ROW, BURLINGTON GARDENS, W.

"MY LORD,—

"12th December, 1881.

"I have the honour to submit, on the part of the Council of the Royal Geographical Society, for the favourable consideration of the Lords Commissioners of the Admiralty, a letter from Mr. T. V. Smith,* representing the critical position of the

* Mr. T. V. Smith's letter is as follows:—

"To the PRESIDENT of the ROYAL GEOGRAPHICAL SOCIETY.

"111, GROSVENOR ROAD, LONDON, S.W.

"MY LORD,—

"November 26th, 1881.

"The following considerations will show the grounds for concluding that the crew of the *Eira* and their leader are in a position which renders the despatch of a well-equipped steamer for their relief, next summer, an imperative necessity.

"The *Eira*, as is well known, was built by Mr. B. Leigh Smith at Peterhead in 1879-80, for the purpose of prosecuting summer voyages of discovery in the Arctic Regions. She is 360 tons burden, builder's measurement, and 50 horse-power, 135 feet long by 25 feet beam. In the summer of 1880 Mr. Leigh Smith made a very successful voyage in her, during which he coasted the southern shore of Franz-Josef Land, and made some interesting discoveries.

"Mr. Leigh Smith sailed from Peterhead in the *Eira*, on her second voyage, on the

steamer *Eira*, belonging to his cousin, Mr. Benjamin Leigh Smith, who is on board, and representing the urgency of an expedition being despatched by Government in the ensuing season for her relief.

"The views expressed in Mr. T. V. Smith's letter have the general concurrence of

13th of last June. He had with him Captain Lofley, of Hull, as master, Dr. Neale the surgeon, both of whom sailed in the *Eira* on her former voyage, and a crew of twenty-two men. He had provisions of all kinds for fourteen months, about two years' supply of bread and flour, and some additional preserved meats received from Gothenburg.*

"The explorer's intention is believed to have been to visit Franz-Josef Land a second time, with a view of making further discoveries on its western side, and he wished, if possible, to push northwards near the meridian of Wyche's Land. But he would on this occasion, as heretofore, have been guided by the state of the ice, using his best endeavours to enter upon new work, in that direction which appeared most open and promising.

"The *Eira* was last seen by the Norwegian schooner *Prøven* (Captain Isakson), off the Matyushin Shar, on the west coast of Novaya Zemlya, on the 8th of last July. She was then going northwards.

"Mr. Leigh Smith had no intention of passing a winter in the ice, and had consequently made no arrangements as regards a rendezvous in the event of accident or for any other contingency. Indeed it is certain that his intention was to return this autumn.

"The edge of the ice between Spitzbergen and Novaya Zemlya, and to the north of the latter group, was visited and closely examined this summer by the Dutch exploring schooner *Willem Barents*. Her report is that the ice was exceptionally low down, consisting of large floes closely packed, in the Barents Sea; but that in August it appeared to be more open to the north and east of Novaya Zemlya.

"Captain David Gray reports that he experienced strong northerly winds in the sea between Greenland and Spitzbergen, during the month of June this year; and that in July easterly and north-easterly winds prevailed. He therefore thinks that a way northwards to Franz-Josef Land was opened to Mr. Leigh Smith in June, and that the winds of July closed up the means of returning. But we now know that the *Eira* had not succeeded in getting beyond Matyushin Shar up to July 8th. She must have pushed northwards to the position in which she is beset, after that date, probably in August.

"The continued absence of the *Eira* has given rise to very grave anxiety. She may either have succeeded in reaching the south coast of Franz-Josef Land and now passing the winter in Eira Harbour, or on some other part of that shore; or she has been caught in the ice to the north of Novaya Zemlya, and is in the drifting pack.

"As the *Eira* is not provisioned for a second winter, Mr. Leigh Smith cannot expose his men to the risk of being detained, and consequently he will be unable to wait on board his vessel until September or even August, for the chance of being released by the breaking-up of the ice. His supplies will only last him until August 1882. It therefore seems likely that he will feel obliged to abandon the *Eira* in the early part of the ensuing navigable season, and endeavour to effect a retreat in boats, by hauling them across floes and taking advantage of lanes of water, probably in the direction of Cape Naassau or Novaya Zemlya.

"The Dutch exploring schooner *Willem Barents* will make a fifth voyage to the Barents Sea, and Sir Henry Gore Booth intends to undertake a similar voyage in a small sailing vessel. Both will, of course, keep a diligent look-out for retreating parties, and all the Norwegian schooners which visit those regions will be requested to do the same. But, useful as they will be in this respect, and comforting as it is to feel that, under any circumstances, the Barents Sea will not be tenantless next summer; still

* Mr. T. V. Smith's informant mistook Grottenham, a farm belonging to Mr. Leigh Smith near Robertsbridge, Sussex, for Gothenburg. Fifty small tins of potted meats were sent to the *Eira* from this place.—Ed.

the Council, and I will not, therefore, trouble your Lordship with detailed remarks on the present occasion.

"I am requested, however, in forwarding the accompanying letter, to bring prominently to your Lordship's notice the strong claim which Mr. Leigh Smith's former services have given him to specially favourable consideration.

"Mr. Leigh Smith has made five voyages to the Arctic regions with the object of increasing scientific, and particularly geographical, knowledge. In the year 1871 he made important discoveries as regards the eastern extension of the north-east land of

it is not possible that sailing vessels can make an effective search. They cannot venture ~~to~~ into the ice or do much more than coast along its outer edge.

"A well-equipped and ably commanded steamer can alone meet the requirements of the case. It is possible that some disaster may have befallen the *Eira*, and that her crew will be in sore need of assistance. It is more than probable that her commander will find himself in great difficulties, and that effective help will be urgently needed.

"It would probably be desirable to leave a depôt on Cape Nassau, with a large and conspicuous cairn; and it would certainly be necessary to visit Eira Harbour, and any other points on the south coast of Franz-Josef Land that can be reached. But these and many other points would receive full consideration from experienced ice navigators with the benefit of the fullest attainable information.

"It may very confidently be expected that the people of England will not desire that a brave crew of their countrymen who have exposed their lives in a cause which is dear to every true Briton should be abandoned to their fate. And an appeal may rightly be made to the President and Council of the Royal Geographical Society to take a lead in representing the necessities of the case. For Mr. Leigh Smith has done good service to geography, at his own sole expense, during a course of years; having made important discoveries both in Spitzbergen and Franz-Josef Land. He has expended at least 18,000*l.* on this object, solely with a view to advancing geographical knowledge. The value of that service was recognised last May when Mr. Leigh Smith received the high honour of being selected as one of the Society's Gold Medallists for the year. The towns of Hull and Peterhead will, it may be assumed, very cordially second any representations that are made with a view to securing the despatch of succour for Mr. Leigh Smith's gallant crew, who are natives of those ports.

"The relatives and friends of Mr. Leigh Smith would venture to request the President and Council of the Royal Geographical Society to take these facts into their consideration; and they beg further to request that Lord Aberdare, on the part of the Council, will bring the subject of this letter to the notice of the First Lord of the Admiralty.

"Such an efficient search as is necessary could be effectually carried out by the Government only.

"There are numerous precedents—the despatch of Sir James Ross in the *Coe* for the relief of missing whalers for instance—to show that the Government have always felt it to be a part of their functions to relieve and rescue the navigators and explorers of the nation when in danger or distress.

"These precedents leave no doubt as to the propriety of such a course on the present occasion.

"A representation from the President and the Council of the Royal Geographical Society will carry with it the greatest weight. It is, therefore, urgently hoped that the request contained in this letter will be complied with, and that an earnest appeal may be made by the President and the Council to the First Lord of the Admiralty to undertake this search—a measure which we feel confident will receive the warm approval of the country.

"I have, &c.,

"T. V. SMITH

"(on behalf of the relations and friends of Mr. Leigh Smith)."

Spitzbergen, and reached the latitude of $81^{\circ} 24' N.$, the highest ever attained in a vessel, to the north of Spitzbergen, except by Captain Scoresby in 1806, and by a Swedish steamer in 1868. In 1872 Mr. Leigh Smith made a second voyage to Spitzbergen, and, although the season was very unfavourable, he took deep-sea soundings, and made other valuable observations. In 1873 he was again in the Arctic seas, and so opportunely, that he succeeded in bringing relief to the Swedish expedition when it was in sore need. So highly were his services appreciated on that occasion, that the King of Sweden conferred upon him the order of the Pole Star.

"In 1880 Mr. Leigh Smith built a ship adapted for ice navigation, at his own cost, with the sole object of geographical research. In the summer of that year he succeeded in reaching the south coast of Franz-Josef Land, made extensive discoveries to the westward, and brought home natural history collections which have been highly appreciated by men of science. For these geographical researches Mr. Leigh Smith received the Patron's Gold Medal of the Royal Geographical Society, the highest honour the Council has it in its power to confer. His present voyage was undertaken with the same objects. He has expended a sum of at least 18,000*l.* in these gallant efforts to extend knowledge. His work, from its valuable results, and the liberal scale on which it has been conducted, gives him a claim upon the grateful appreciation of his country.

"On these grounds the Council would submit that Mr. Leigh Smith and the crew of the *Eira*, now that they are in a perilous and critical position, have a special claim for national aid; and they, therefore, feel justified in urgently appealing to the Lords Commissioners for a favourable consideration of the request contained in the accompanying letter.

"I have the honour to be, my Lord,

"Your Lordship's most obedient servant,

"**ABERDARE.**"

That (the CHAIRMAN continued) was all the Society could do in a case of this sort, and it gave a sufficient answer to the objections which had been made, that the Government was not bound to risk the lives of their men and incur any great national expense for the relief of mere adventurous travellers who plunged into unknown regions. Mr. Leigh Smith had done very good service in the past, and was a very fit object for national aid, as all the best geographical authorities considered. A deputation had been named from the Council, to be accompanied by other scientific authorities, to wait upon the First Lord of the Admiralty on the 20th inst., for the purpose of laying the statistics in full detail before him; and he had every hope that a favourable answer would be received. With regard to the *Jeannette*, he was sure they all wished Lieutenant Hovgaard every possible success, and he trusted that when he returned from his mission to America he would again address the Society before starting for the northern seas, and explain more fully the object he had in view, and the means by which he hoped to accomplish it.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—December 2nd, 1881: Colonel F. PERRIER, of the Institute, President of the Central Commission, in the Chair.—A letter was read from M. Ledoulx, French Consul at Zanzibar, giving various items of news respecting French missionaries in East Central Africa, and stating that Captain Bloyet, chief of the station in Usagara, was detained by illness at Bagamoyo.—A copy of the great work, entitled '*Atlas des Anciens Plans de Paris*,' was presented to the Society by the President of the Municipal Council.—A communication was read from the Geographical Society of Lyons, enclosing the report of the Committee

journey from Suez to Lake Victoria, and his residence in Uganda. Mr. Pearson and his colleague travelled with the Rev. C. T. Wilson and Mr. R. W. Felkin, and an account of this journey by the latter has already been published in our 'Proceedings.'* Mr. Pearson referred to the despatch of the Waganda envoys to England in 1879, in company with Messrs. Wilson and Felkin, and their return this year with the Rev. P. O'Flaherty. In the interval his position became very critical, as he was left without cloth to buy food with, and also suffered severely from fever. On the arrival of the envoys Mr. Pearson left for the coast by way of Uyui, and arrived at Saadani on the 30th of last September. Mr. Pearson afterwards gave an account of Mtesa's country and its institutions, as well as of the manners and customs of its inhabitants, descending especially on the extraordinary fertility of Uganda. Among other matters, he mentioned that the natives are very clever at building canoes for navigating the lake. These canoes, which will carry a few passengers, are made of planks fastened together by fibres, and caulked with oxide of iron, not a single nail being used. The navigation of these vessels, however, is exceedingly troublesome, as they leak continually, and half the crew are generally engaged in baling water out. Mr. Pearson has brought back with him a Wahia girl, about seven or eight years old, whose intelligent face and brilliant eyes attracted much attention at the meeting. He also exhibited a number of specimens of the industry of the country, including bracelets, silver and copper rings, well-made lances, curious napkins, musical instruments, enormous pipes, cups made of the horn of the rhinoceros, &c.

Geographical Society of Lisbon.—December 6th, 1881: Visconde de S. JANUARIO, Honorary President, in the Chair.—The Chairman laid before the Meeting a fine hydrographical work executed by two officers of the Portuguese navy, and took occasion to remark on the imperative necessity for organising a survey of the ports of the Portuguese possessions and the revision of existing charts, a work regarding which the Lisbon Society had already drawn up a project. Various members addressed the Meeting on this subject, viz. Dr. Novaes, Dr. Lima, Councillor Pereira de Sampaio, Major Serpa Pinto, Dr. Pedroso, and Señor F. Ribeiro.—Señor Sampaio, late Governor of Cape Verde, gave the Meeting an account of the Colonial Exhibition held during the term of his governorship of that province, and mentioned that some of the objects exhibited were now sent to the Society.—A discussion then took place on recent explorations in Africa, in which Señor Pedroso and Major Serpa Pinto took part. It was urged that the Portuguese Government cannot without serious detriment neglect the continuation of these explorations, and it was resolved that renewed representations shall be made to Government on the subject of the projected Ambaca and Lourenço Marques Railways, further scientific surveys, and the establishment of consulates.—A few words of high commendation were, in conclusion, pronounced by the President, on the subject of a new work in MS. on India, presented to the Society by Señor Lopes Mendes.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

AFRICA.

Schwarz, Dr. Bernhard.—Algerien (Küste, Atlas, und Wüste), nach 50 Jahren französischer Herrschaft. Reiseschilderung nebst einer systematischen Geographie des Landes. Leipzig (Frohberg): 1881, 8vo., pp. 398, map, illustrations. (*Williams & Norgate*: price 10s.)

After a general introduction (in which, pp. 7 and 8, notes, a short bibliography of sixteen works is given, with mention of some in Arabic and of available

* See vol. ii. p. 357.

maps), the author describes his experiences of Algeria. Crossing from Carthage to Oran, he discusses the western province, following the valley of the Shelif to Affreville. From Algiers he visited Constantine, and then struck south, reaching the Sidi Okba oasis a little south of Biskra. A good general sketch of the geography of Algeria in all its aspects concludes the work, which is illustrated by a coloured map (scale 1 : 2,800,000) showing physical and political features, and by some well-executed plates.

Selous, Frederick Courteney.—*A Hunter's Wanderings in Africa: being a Narrative of Nine years spent amongst the game of the far Interior of South Africa, containing accounts of Explorations beyond the Zambesi, on the river Chobe, and in the Matabele and Mashuana Countries, with full notes upon the Natural History and present distribution of all the large Mammalia.* London (Richard Bentley & Son): 1881, 8vo., pp. 455, map, plates, woodcuts. Price 21s.

Mr. Selous started as an elephant hunter in South Central Africa in the autumn of 1871, and after a trading trip through Griqualand, travelled from Kimberley to Shoshong, Tati, and Gubuluwayo. From the latter place he made various excursions to the north-east, past Inyati to Sebakwe and the upper waters of the Umniati, and also to the north-west down the Gwai to its junction with the Shangani south of the Zambesi, hunting in the neighbourhood of Linquasi. Early in 1874 he returned to Tati, and struck north-west to the Zambesi, reaching the Victoria Falls at the end of June in that year. He remarks that the nights at that time were very cold, in spite of the comparatively short distance from the equator; the temperature was in the day about the same as that of a summer's day in England, though not so oppressive, from the drier atmosphere. Ascending the river to the Chobe junction, the latter was followed on its southern bank, excursions being made both on the north and south sides of its swampy extension and islands, and the most westerly point reached being 23° E. long. Mr. Selous notes that the word "Chobe" (which according to Livingstone is the name by which the river was known to the Makololo in the time of Sebituane), conveyed no meaning to the natives now living along its banks, who have no particular name for it, but call it differently opposite each town; and he suggests that "Chobe" was very likely either the name of some particular part, or of the headman of some town on its banks whom the great explorer visited. Returning to Wankie's town on the Zambesi, the author struck south-west to Thamna Setje on the Tati road, and then travelled south through the Transvaal and Natal, reaching Durban in April 1875, and returning to England.

In March 1876, he again landed at Algoa Bay, and soon found his way to Tati, passing the rest of the year in excursions up and down the Tati, Shashi, and Ramokwebani rivers, and also visiting Gubuluwayo and the Diamond Fields. Early in April 1877, he set off from the Zambesi and Chobe (meeting Lieutenant Grandy, shortly before his death), but, not being very successful in his ivory hunting, crossed the Zambesi at the end of October (finding the temperature now intensely hot and enervating, the thermometer marking 87° at day-dawn, and 110° at mid-day, in the shade, with a breeze blowing), and followed its north bank to Nhaucó, where he crossed to the south side, making some stay on Capoko Island. From that point he started north for the Manica country in December, once more crossing the Zambesi and reaching Sitanda's kraal (about 14° S. lat.) in the first week of January 1878. Here Mr. Selous and a companion (Mr. Owen) were prostrated with fever; and as supplies were short, he returned to the Zambesi, recrossed it, and followed a southern track parallel with the Umay to Inyati in the Matabele country, which he reached much exhausted early in May. In the following August, he once more journeyed east to the Mashuana country, exploring the country east of the Umfuli, and visiting the Hanyane (so called by the Matabele, though termed "Manyame" by the Mashuanas, and "Panyame" near its Zambesi confluence). The furthest eastward point reached was Mount Hampden (about 31° 30' E. long.); and the return to Inyati was made at Christmas 1878.

In 1879, the author worked through Khama's country north-west of Bamangwato, through the Salt-pan region to the Mababe plain and the Chobe swamp

once more, reaching Mai-ini's town at its western end, and returning to Bamangwato in December.

In May 1880, Mr. Selous started for his last trip to the Mashuna country: during this, the journey with Mr. Jameson was made along the Umfuli to its junction with the Umniati, which is recorded in our 'Proceedings' for June 1881, and which resulted in correcting some serious errors in the hydrography of that region. Returning in November to Gubuluwayo, the author journeyed along the borders of the Kalahari desert to Griqualand, and reached the Diamond Fields in February 1881, reaching England in April.

The chief scientific value of his book is naturally zoological, and it is almost impossible to speak too highly of the excellence of his plates of the heads of the antelopes of South Central Africa, or of his field notes upon them and the other game which he met with. His incidental observations on subjects of such interest to South African travellers as the distribution of the dreaded tsetse fly, and on various matters of topographical and economic importance referring to the very wide field of operations above indicated, also assist in elevating his journals from the mere stand-point of a hunting diary.

ARCTIC.

Nordenskiöld, A. E.—The Voyage of the *Vega* round Asia and Europe, with an historical review of previous Journeys along the North Coast of the Old World. Translated by Alexander Leslie. London (Macmillan): 1881, 2 vols., 8vo. pp. xxv. and 524, xvii. and 464, maps, plates, woodcuts [no index]. Price 2l. 5s.

The editions in Swedish, German, and Dutch, of Baron Nordenskiöld's narrative of his successful North-Eastern passage having now been for some little time completed (being issued in separate numbers), an English translation is at last accessible. Mr. Leslie, it will be remembered, has already published a preliminary volume containing particulars of the illustrious traveller's prior voyages, with the main features of the present one.

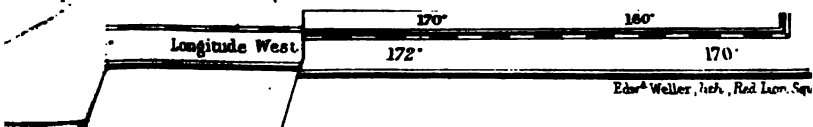
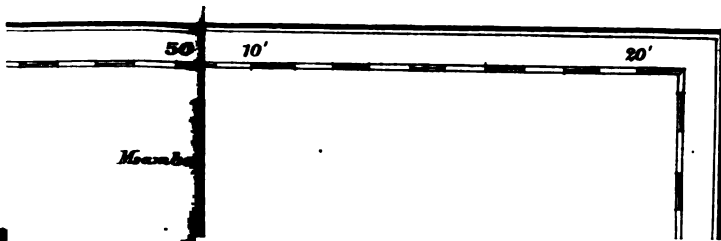
The real work of the expedition does not practically commence until Chapter VII. (p. 318) of Vol. I.; the preliminary portion being occupied with an explanatory Introduction, description of the equipment, &c., and a valuable discussion on earlier voyages with the like object, interspersed with ethnological and zoological observations, and physical details connected with the progress of the voyage as far as the mouth of the Yenisei. From that point the narrative continues, with occasional historical and ethnological interpolations (especially Chapter XIII., pp. 148-218 of Vol. II.) to the successful return to Stockholm.

It is impossible in the space of such a notice as the present to give even a complete outline of the contents of this fascinating work. The ability of the author and of the members of his staff in so many branches of science, the great extent of the journey, and the long period of inaction during it, have resulted in the accumulation and elaboration of a great mass of material of the highest possible interest, whether to the geographer or general reader. Profuse and excellently rendered engravings of scenery and ethnological, botanical and zoological objects, and numerous maps, original and reproduced, leave nothing to be desired in the way of illustration. Some of the Arctic scenes, reproduced from photographs, are of especial value.

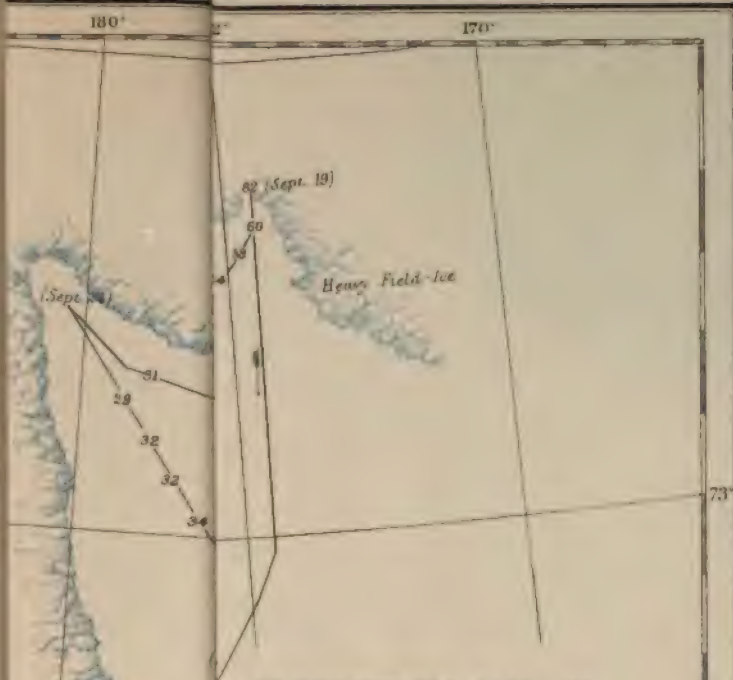
The historical portion, though apparently interfering with the sequence of the narrative, will be found of great utility; and the references to authorities given in the notes enable the reader to extend his researches with facility.

Two large maps are given (scale 1:4,000,000) showing the North Coast of the Old World from Norway to Behring's Straits, and the track of the *Vega*, with various indications of observations during the voyage, by N. Selander; an inset is given of the track of the *Vega* through Behring's Straits. Original maps of Port Dickson (scale 1:200,000), Cape Bolivan, Malygin Sound, Cape Chelyuskin, and Taimur Sound, are also given, with a reproduced delineation of the drainage area of the Obi, Yenisei, and Lena.









PRELIMINARY MAP OF
VRANGELL ISLAND

from a Survey by
L. Berry, U.S.N. in the steamer "Rodgers"
to illustrate the paper by
C. R. Markham, C.B., Secretary R.G.S.

The heights are expressed in Feet
The sounder in Fathoms.

Scale of Statute Miles

Scale of Geographical Miles





PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Notes on the Basin of the River Rovuma, East Africa.

By JOSEPH THOMSON.

(Read at the Evening Meeting, January 16th, 1882.)

Map, p. 128.

[Mr. Thomson's paper was read to the Meeting by Sir John Kirk, H.M. Consul-General and Political Resident at Zanzibar, who prefaced it by the following remarks:—

In the paper about to be read Mr. Thomson gives an account of an examination of the Rovuma valley and surrounding district, which he was commissioned to make by the Sultan of Zanzibar. His expedition had for its object to ascertain the nature and value of the coal that had been said to exist in the southern part of the dominions of Zanzibar. The probable existence of coal in this region was first indicated in the course of the Government East African Expedition under Dr. Livingstone; fragments of apparently good mineral were then seen in the river-bed, but the rocks from which these had been washed were not reached, and nothing was known beyond the fact that somewhere higher up, there must exist beds of a carboniferous nature.

On the attention of the late Seyed Majid, the predecessor of the present Sultan of Zanzibar, being called to this observation, natives were sent to bring back samples and to discover whether coal existed in the rocks along the course of the Upper Rovuma. These men reported that coal had been found in the face of a low hill. The substance they brought back consisted of surface coal or shale much weathered by exposure. On being sent to Bombay this was reported on by the Government analyst as a sort of inferior coal, fit only for local use, and containing in the samples he had to examine 25 per cent. of ash.

After the accession of the present Sultan, Seyed Barghash, the inquiry was resumed in order to discover whether coal might not be found nearer the coast, at the same time the Rovuma was again examined. The search near the coast was rewarded by the discovery of a peculiar kind of lignite, which has been examined by Dr. Percy, of the School of Mines, and found to be similar to that from Trinidad, remarkable for containing an unusually high amount of included water, which renders it of no economic value. The party that ascended the Rovuma found that the rapids near the junction of the two rivers could easily be passed in canoes, and that the so-called coal-beds were accessible. A most important and essential preliminary to any

further examination was also effected about this time by Seyed Barghash, through the pacification of the native tribes referred to by Mr. Thomson in the course of his paper.

Under these circumstances, Mr. Thomson was sent by the Sultan of Zanzibar to determine and report upon the nature, extent, and economic value of these coal formations, and we are greatly indebted to him and to the Sultan of Zanzibar, with whose permission it has been communicated, for this interesting account of a journey, in the course of which Mr. Thomson has succeeded in throwing valuable light upon the geology of a part of Eastern Africa.]

THE river Rovuma, near the boundary line which separates the territories of the Sultan of Zanzibar from Mozambique, has received no inconsiderable share of attention from various classes of people. Along its banks Livingstone proceeded in his last journey, and by his revelations of the horrors attendant on the slave trade there, drew the eyes of Europe on that leper spot of East Africa. Since then the Universities Mission has established itself within easy distance of its upper waters, and its agents have made frequent excursions along the river and its tributaries.

Notwithstanding these visits, however, comparatively little is known with regard to the geographical and other scientific aspects of the region. Livingstone did not live to fill up and extend the somewhat meagre details he left behind in his journal, while the gentlemen of the Universities Mission have surveyed the country more with the eyes of the missionary and philanthropist than of the geographer, although a great deal of most interesting and valuable matter has been collected by them. I need but mention the papers of Bishop Steere and the Rev. C. Maples.

I propose in the following paper to lay before the Society a few additional notes on this interesting region, made during a recent trip in search of the long-talked-of coal of the Rovuma.

The circumstances under which I undertook this quest are these. For some years back various reports of the existence of coal-fields on the Upper Rovuma reached the coast. Livingstone found fragments of it, and other samples found their way to Zanzibar. His Highness Seyed Barghash, naturally interested in this possible wealth, sent an Arab, and afterwards a Parsee engineer to examine into the matter, both of whom returned with glowing accounts of the great abundance of the coal and the ease with which it could be quarried or mined. Here surely was sufficient ground for the most brilliant expectations; but these fortunately were kept in check by prudent advice in high quarters at Zanzibar, and it was resolved that some reliable person should be employed to examine the coal before anything else should be done. I had the honour of being selected for this task, and as it chimed in with my ardent desire to see and know more of East Central Africa, I readily undertook the work, although I was sceptical of the existence of any coal of the slightest commercial value.

I arrived at Zanzibar at the end of June last, exactly a year after leaving it on the completion of the Society's East African Expedition. I had the pleasure of distributing, along with Dr. Kirk, the medals which the Council of the Society had directed to be presented to my faithful followers. They, along with Chuma and Makatubu, had just returned from the disastrous expedition of Captain Wybrants, and were ready to join me again.

A fortnight after my arrival saw us steaming out of the harbour of Zanzibar bound for Mikindany, notable as the place from which Livingstone started on his last journey. On the 13th of July we landed at our destination, and commenced our final preparations.

We found that Mikindany had prospered immensely since Livingstone visited it in 1866. Then there were few houses, no cattle, and but a small trade in orchilla weed and gum copal. Now there is a very large population of both Arabs and natives, a considerable colony of Banyans and Hindi, and large numbers of goats and cattle; while the trade has increased exceedingly, almost the entire produce of the Rovuma region finding its way there—gum copal, rubber, millet, rice, and other grains being the chief articles, though the trade in ivory and slaves from the Makua and Wahyao districts is by no means unimportant. South of Bagamoyo, Mikindany will now rank in importance next after Kilwa and Lindy.

The large trade in slaves, which goes on surreptitiously notwithstanding all the attempts that have been made to suppress it, still fosters the old feeling of exclusion which formerly so much troubled intending travellers on the east coast, and it was very clear to me that but for the Sultan's authority every possible obstacle would have been thrown in my way.

I had at first intended to have followed Livingstone's route along the Rovuma, but while at Mikindany I changed my mind and determined to proceed direct to my destination through the Makonde country.

Having completed all necessary preparations, we started on our journey on the 17th of July with a caravan of sixty men. Ascending the eastern escarpment of what we may here call the Makonde Plateau, which at this point faces the sea, and appears as a range of hills from 200 to 300 feet in height, stretching from the Rovuma to Lindy, we proceeded for 10 miles nearly south; thereafter our route lay nearly W.S.W. as far as Ngomano, where the river divides.

The special characteristic of the country we thus entered is indicated by its name "Makonde," which means the country of bushes and creepers, and no better name could be applied to it, for, from one end to the other it is one dense mass of tangled vegetation, so much so that a person might actually struggle along several miles without ever once touching the ground under him. The labour of pushing through such a country with a loaded caravan is simply enormous, and it is one of the

most painful experiences of the native porter, who has to tramp along with bent back under a load of from 60 to 70 lbs. The pathways are so many low tunnels through the dense thicket, where one is ever in danger of being tripped by trailing roots and creepers, or caught in the face by others at a higher level; and, to make matters worse, the road is studded with the sharp stumps of cut bushes, which wound and lame the feet of the men sadly.

With such a vegetable covering it may be understood that the aspect of the country is supremely monotonous. There are no large trees, and indeed trees of any description are only to be found in very favourable situations, such as along the nullahs which drain the country in the wet season, and usually retain a considerable quantity of water in the dry, from which the natives draw their supply of that necessary fluid. The soil is extremely fertile, and notwithstanding its apparent absence of water, large crops of various grains are raised by the inhabitants.

To the eye Makonde (the term is applied to both country and people) appears as a uniform level plain, without the slightest irregularity beyond the occurrence of an occasional shallow nullah; but although a plain it is not by any means level, as there is a regular rise in the altitude from 200 feet at the coast to 2572 feet at Kwamatola, 70 miles inland, and near the western edge of the plateau, where it suddenly dips down into the valley or plain of the Rovuma.

If, instead of traversing the top of the plateau, we had marched along the banks of the river, the skirting heights would simply have appeared as a very precipitous range of hills running W.S.W.; rising in altitude inland till reaching the meridian of 39° . From this point the high land turns suddenly north, then E.N.E., reappearing at the coast again at Lindy; it thus sharply defines the limits of the country of Makonde, and forms a small plateau 70 miles long and 30 broad.

The origin of this geographical feature is evidently to be ascribed to the denuding action of the Rovuma on the south side, its tributaries on the west, and the Lindy river on the north. Geologically, Makonde is formed of coarse red and grey sandstone, 800 to 1000 feet in thickness, resting unconformably upon metamorphic rocks.

With regard to the Makonde people I shall speak in the sequel, when I come to make some general remarks on the inhabitants of the basin of the Rovuma.

At the western confines of Makonde we suddenly emerged from the wretched jungle through which we had struggled for eight marches, and a magnificent and extensive view of the Rovuma valley and plain broke upon us. Away to the south, at a distance of 12 miles or thereabouts, a silvery streak, winding through yellow sands, with a margin of dark green, proclaimed at once the river Rovuma; away beyond an even plain of yellow hue tinged with green it stretches southward, till lost in the haze and smoke which at this season of the year limit all extensive views.

To the east the valley of the Rovuma, with its lagoons, marshes, and meadows, and its enclosing precipitous hills, extends in variegated colours and irregular outlines. To the west of our position this valley widens out, loses its defining hills, and spreads out as a great plain to the north, south, and west without other apparent boundary than the hazy distance. But the chief feature which attracts the eye in this plain is the number of extraordinary isolated hills which give variety to the otherwise monotonous landscape. They appear in every possible shape as peaks, domes, cones, needles, &c. They all rise abruptly from the surrounding country, and present a scene not easily forgotten.

From this point we make a precipitous descent of 767 feet to the village of Kwamatola, which lies at a height of 1845 feet. The inhabitants are mixed Wahyao and Makua, under a very intelligent chief called Matola, who gives his name to the village. The Universities Mission has a station here, and seems to have gained the complete confidence and respect of the people, a step not easily attained, but necessary before any good can be done.

On leaving Kwamatola, we make a further descent of nearly 300 feet, and enter the tract I have designated the Plain of the Rovuma. We here notice two important facts, namely, that we have now left behind us the sandstones, and that the metamorphic rocks now crop out at the surface, the sandstones having been denuded.

Coincident with the descent in altitude and the geological change, we observe also a botanical one. A thin open forest of mimosas and other trees takes the place of the dense tangle of Makonde, which is now only seen in small patches along the banks of streams. Gum copal and rubber also disappear, and I may here observe that I have not yet seen or heard of the former being ever found in soil directly overlying granitic or metamorphic rocks, and the same might almost be said of the latter.

Across this plain to the confluence of the Lujende and the Rovuma is a distance of 55 geographical miles in a direct line, requiring five hard marches. Except along the banks of the nullahs and streams, the soil is very barren, being shallow and stony. There are no inhabitants, except a few Matambwe hidden away on inaccessible islands, the few villages seen by Livingstone having since then been completely swept away by the raids of the Maviti.

The country thus converted into a desert is literally swarming with game, such as the water-buck, bush-buck, eland, koodoo, harris-buck, gau, hartebeest, buffalo, quagga, zebra, pig, lions, leopards, hyenas, Cape hunting dog, and many other of the larger animals.

We first reached the banks of the river, in E. long. $38^{\circ} 40'$ and S. lat. $11^{\circ} 10'$, where a large river named the Mbangala joins it. The altitude of the Rovuma at this point is only 370 feet.

Along the south bank at this part there is a low ridge, here and there breaking into curious hills. The river is about three-quarters of a mile broad, with great stretches of yellow sandbanks, glittering under a vertical sun. The banks are particularly charming, from the beauty and variety of the trees with which they are clothed, amongst which are many of elegant and many of grotesque forms. The yellow-wood tree of the Cape and the tamarind are prominent, and palms of various kinds, and grotesque baobabs, form a contrast and add variety of shape and hue.

On the 3rd of August we reached the confluence of the Lujende and the Rovuma. The altitude of the river at this point is 730 feet. The village of Ngomano we found had suffered the same fate as most other African villages, and no trace of it is now left.

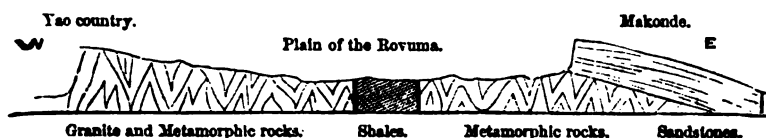
Our route from this point led us along the Lujende, nearly due south. Three marches along its banks brought us to the Maviti village of Itule, where the so-called coal was said to be found.

My worst fears were more than realised. Much to our disgust we discovered that the coal was nothing more nor less than a few irregular layers of bituminous shale, which when placed in a wood fire emitted a flame, but remained almost unchanged in bulk. It does not even burn alone. Accompanying the shale we found small quantities of a curious anthracite-like substance, which could be set on fire only with great difficulty, but left more than 50 per cent. of ash.

From Itule we proceeded other two days up the river to a place called Kwamakanja, inhabited by Manyanja, from near Nyassa. Here the coal was said to be specially abundant. I, however, met with no better success, and as the series of beds containing the shale finishes abruptly at this place, as it had commenced abruptly at Itule, it became clear to me that the coal-beds of the Rovuma had no existence. These bituminous shales occupy a curious position geologically. They occur in a very restricted area, a sort of hollow or pocket, stretching from Itule to Kwamakanja, a length of nearly 20 miles, and nowhere more than a third of that in breadth. The enclosing rocks are gneiss and granite. These shales and sandstones must either have been deposited *in situ* in a small tarn or lake, or have been let down by some great fault from a formerly higher level, the sandstones already mentioned having at one time extended over this area, and been subsequently denuded completely by the Lujende and Rovuma.

This latter theory is the more probable of the two, and is supported by strong evidence—thus the shales and sandstones are much altered and broken along the line of junction with the granites, and secondly the anthracite-like substance occurs alone near the junction, and in such a manner as to suggest the idea of its having been distilled or fused out of the bituminous shale. The accompanying diagram will give some idea of the geology of this region.

At Kwamakanja where the shales and the gneiss come in contact, a fine cataract has been formed by the more rapid wearing away of the softer rock, and over the gneiss by many channels the river roars with great violence. On the almost inaccessible bare rocks the Manyanja of the district live during the dry season.



Up to the cataracts the Lujende lazily winds its way nearly due north and south, between wide tree-clad banks, and amid great stretches of sand; beyond that point the river takes a turn south-west, then nearly due west, for several days' journey, sandbanks are less abundant, long still reaches more common, separated by rocks and cataracts, while the bed contracts in breadth. Of the origin of the Lujende I could hear nothing from the people, who seemed to be absolutely ignorant of its course beyond an important Yao chief named Mtarika.

Having completed my work, I now set about my return to the coast, but before doing so I visited the important Makua village and district of Kwanantusi.

One of the strange isolated mountains, named Lipumbula, was here specially conspicuous, and I resolved to ascend it. The task proved to be much harder and more dangerous than I had bargained for, and it was only after three different attempts that I succeeded, at the cost of skinned hands and trousers worn out at the knees. Lipumbula rises like a huge broken column from the surrounding plain, and proved to be a perfectly compact mass of granite, almost without a single flaw or joint, except on one side, where a joint had proved a line of weakness, giving scope for the insidious action of various weakening agents, by which the otherwise unvarying outline of the solid mass had been destroyed, producing a precipitous ravine, and a talus at the bottom, by which we were enabled to make the dangerous ascent. Except along this line there was hardly a trace of vegetation, beyond a few tufts of a curious wiry grass. The total height of Lipumbula is 1805 feet, and its height above the plain 970.

The view presented from the top was that of a great plain dotted with the most fantastic hills, resembling from our elevated position so many curious ant-hills. At the foot of the hill the Lujende could be discerned, winding away to the west, as far as the eye could reach, with a very dark green border of trees, here and there breaking into different channels, enclosing tree-clad islands, or widening out into beautiful pools.

Lipumbula is simply a counterpart of all these strange hills, being

marked by exactly the same characteristics except that of shape. They are evidently the result of the denudation of the surrounding country—the less compact and more decomposable schists, &c., which form the greater part of the rocks, having been weathered, levelled down, and washed away, leaving the solid and compact bosses of granite or gneiss standing out in relief, and having neither flaw nor joint, bid, as it were, defiance to the elements.

The height of the Lujende at Kwanantusi is 835 feet. I had hoped to have followed it further up, but finding there was no hope of discovering anything connected with the object of the expedition, I reluctantly gave up my intention.

Not to return by the same route, I determined to cross to the Upper Rovuma, and descend thence to Ngomano. Four hard marches through an uninhabited country, covered with thin forest growing on a stony barren soil, brought us to the considerable village of Unde, situated on a small island for greater security. The people are a mixed race of Makua, Matambwe, and Manyanja.

The height of the Rovuma at this point is 1198 feet, being 363 feet higher than at Kwanantusi, showing how much more rapid is the rise of the Rovuma than the Lujende. The country on leaving the latter river begins gradually to lose its plain-like character, becoming more undulating and rugged, and breaking here and there into low ridges of hills. From Unde the Rovuma flows for a short distance east, then north to a short range of hills, where it turns east again through a wonderfully picturesque gorge, with cataracts and deep pools, and having granite mountains on both sides. The scene at this place is grand and weird in the extreme—the immense rocks and boulders which fill the bed of the river, the smooth and symmetrical dome-like hills, with scarcely a crack or irregularity, and exhibiting only a few stunted leafless bushes, rendering the general absence of vegetation all the more conspicuous. The surrounding country partakes of the same strange and barren aspect, so much so that but for the heat, we might have imagined ourselves in the Arctic regions, examining a tract of country newly emerged, polished and shaped, from beneath some great glacier.

From this point eastward the country gradually assumes its plain-like character.

Arrived once more at the confluence of the two rivers, I crossed to the south side, and continuing my way to the coast, passed first E.S.E., then E.N.E. through a great uninhabited desert, in which we found but one Makua village, named Mkomolo, where I came upon the tracks of the Rev. C. Maples and his companion on their way from Masasi to Mozambique, through the Makua country.

In this desert, which is the counterpart of the country we passed north of the river, water is very scarce, and we were several times in great straits for want of it. At Mkomolo we were glad to pay an

enormous price for sufficient liquid mud to stave off our thirst after a very hard day's march.

It may be remarked here that the time of my visit was the middle of the dry season, the whole country being dried up. During the whole of our trip we only crossed four running streams, two being on the Upper Rovuma, having their source in some distant hills, and the other two from the Mawia Plateau.

Four hard marches from Ngomano brought us to the base of the latter, which is simply the southern extension, cut off by the Rovuma, of the Makonde Plateau, and rising like the latter abruptly from the plain of the Rovuma to a height of 2400 feet.

This plateau is properly the country of the Mawia, Maviha, or Mabiha as they have been more commonly called, who have, however, of late years retired from the line of traffic, partly owing to their exclusive habits, and partly by being ousted by Makua, Wahyao, and Matambwe, who have cut them off completely from the Rovuma.

From the western escarpment of the Mawia Plateau, our course lay along the edge facing the Rovuma, of which we had occasionally excellent views. The country descends in altitude westward evenly though rapidly. Along our route we were fortunately not troubled by the tangled vegetation which so retarded our movements in Makonde. Further south, however, in the region now occupied by the Mawia, the bush is quite as bad.

As we approach the sea the country is marked by the absence of watercourses, and by the abundance of curious little lakes and ponds, which appear to me as having been hollows in an ancient sea-bed, now raised out of the water.

On the 10th of September, I reached the coast, a little south of Cape Delgado, having been occupied only seven weeks on the trip, during which we tramped over from 600 to 700 miles roughly calculated.

One word as to the accompanying map, and I have done with the geographical part. The latitudes are, in almost every instance, from observations of the stars or the sun, while the longitude is by dead reckoning, not then having chronometers. The heights are from aneroid and boiling-point thermometer observations, corrected for pressure and temperature at sea-level.

Let me now conclude with a hasty sketch of the tribes inhabiting the region of the Rovuma, without which a paper on its geography would hardly be complete.

In this restricted area we find seven tribes, or at least the remnants or representatives of that number, as some of them can hardly be said to exist as distinct tribes. These are the Makonde, Matambwe, Maviti, Manyanja, Makua, Mawia (Mabiha), and Wahyao (Wayao).

The district inhabited by the Makonde I have already described as being the plateau between the Rovuma and Lindy rivers.

They are about as ugly a set of people as are to be found in East Africa, and certainly occupy a very low grade, a fact to be accounted for to some extent by the peculiar nature of the country they inhabit. The women are especially ugly, with short squat figures, and faces of a most repulsive aspect.

Not content with their natural ugliness, they have resorted to the strangest possible means to enhance it, and with every success. They cover their faces and bodies with the most inartistic tattooing in what we may call the bas-relief style, forming zigzag lines, various geometrical figures, such as squares, triangles, &c., and figures with a faint resemblance to trees.

The process must be extremely painful. They first make the required pattern by a series of short cuts with a knife, rub charcoal into the wound, and leave it to heal up. If now left alone it heals up, and only shows the pattern by the colour; but that is not what is wanted, so the process is repeated a second time, and then a third, on which the pattern is shown not only by the black colour, but also by the raised skin. It is thus that the negro lover delights to stroke the skin of his mistress and praise the beauty of her markings, when the moon is bright and pombe and the dance have made his heart glad within him.

The most extraordinary ornament of the Makonde women, however, is the *pelele*, which is a circular piece of wood variously carved and adorned, worn in the upper lip. They are commonly two inches in diameter, and when sticking straight out suggest the idea of a duck's bill. As the women advance in age, and the *pelele* increases in size, the lip and *pelele* hang down over the mouth, and actually cover the chin, extending in many cases below, until they resemble the snout of the American tapir, all the more so owing to the flatness of the nasal organ and the thickness of the lips. These *peleles* are always made by the husband in early life, and the lover and the Makonde ladies would no more think of disposing of these presents than an English lady her marriage-ring. When a woman dies the *pelele* is always kept most religiously by the husband, and when he goes to water the grave with pombe—not his tears—he carries it with him to show the departed one that he is still faithful to her memory.

Both men and women wear the simple loin-cloth, not from want of material, but to show off their beauty-marks, for the mutual purpose of ensnaring each other. They wear a large amount of large beads and thick brass wire. Their huts are circular with a conical roof.

Owing to the large amount of rubber and copal which they are able to collect each year, they have become exceedingly saucy and difficult to deal with. We found it almost impossible to buy food from them, as at that time they did not choose to dispose of their surplus grain and, indeed, prefer to turn it into native beer, of which they are inordinately

found, whole weeks being sometimes given up to a village debauch. When any one dies the grain he leaves behind him is at once converted into pombe, and the whole neighbourhood invited to wake him right royally.

They have many curious customs. When a woman bears a child she lives completely apart from her husband till the child is able to speak, as otherwise it is believed that harm, if not death, would come to the infant. When the latter is able to speak it is taken to where two roads meet, and at the angle the child is washed and rubbed with oil, and then handed over to the husband, who may thenceforth cohabit with her. There are many peculiar superstitions connected with the angle formed by two cross-roads all over Eastern Africa. When any one dies, the water used in washing the body and the ashes of the house are carried thither and deposited along with other things, such as eggshells and broken pots. The Makonde appear to have an unusually high moral standard. Offenders before marriage are punished severely, and any offence after marriage still more so, the women being frequently driven from the village. The marriage ceremony is somewhat different from the usual one prevalent in East Africa; no presents to the bride or her parents being required, and the girl is left to decide for herself. Having done so, she enters the bridegroom's hut, sweeps and cleans it out; that completed, the happy man arrives, leaves his gun at the door, and enters; and this completes the business.

There is no tribal chief among the Makonde, each headman of a village being totally independent of all others.

During the Maviti raids at, and subsequent to, the time of Livingstone's visit, the whole country through which we passed was quite deserted, the people taking refuge among the coast people, or else retiring to the small islands in the Rovuma. Six years ago the Sultan of Zanzibar interfered and stopped the further ravages of these marauders, and caused them to "make brothers" with the Makonde, who were thus able to return to their homes in peace.

Of the Matambwe little need be said, as they differ but little from the Makonde. As a tribe they can hardly be said to exist, the Maviti having completely broken up and scattered them, till now only a few are found living in small islands in the Rovuma, or scattered among the Makua and other tribes, the rest being killed and made slaves of. Their country proper is that region which I have described as the plain of the Rovuma, at least, that part more immediately surrounding the point of confluence of the Lujende and the Rovuma.

Under their hard fate they have become exceedingly retired and timid, except when they are under the protection of a powerful friendly chief of another tribe. They are rather lighter coloured and better formed than their Makonde cousins, but differ from them in no other respect. Notwithstanding the fact that slavery has been their ruin,

the system is so thoroughly engrained in them, that kidnapping, buying, and selling slaves, is quite as among the worst tribes.

The Manyanja are only represented by a few people scattered here and there among various other tribes. They are closely allied to the Matambwe, though properly they do not belong to the region under consideration. There are a considerable number located at Kwamakanja, near the cataracts of the Lujende.

The dreadful Maviti, of which so much has been heard at various times, deserve our special notice. Maviti, Mavitu, and Mangone, are the East African names for the Zulus, who have found their way north of the Zambesi in their war raids. The people who bear the name of Maviti on the Rovuma have, however, not the slightest right to bear the name, beyond the fact that they have to some extent copied the mode of warfare practised by the Zulus. They belong to a tribe called Waninde, who inhabit a district west of Kilwa, and who also gave origin to the Mahenge tribe now living in the angle formed by the Ruaha and the Urunga.

Like the latter, the Maviti originated in a great Zulu raid, which swept over the country many years ago, and when even Kilwa itself was threatened with destruction. According to their usual custom they retired to their own country, but leaving behind them the germs of a much greater and more widespread evil than a temporary raid. The Waninde, who seemed to have had cooler and more calculating heads than the majority of their neighbours, had observed and probably felt themselves, the paralysing terror which took possession of every one on the mere sight of a Zulu headdress, or the sound of their war cry, resolved to take advantage of this feeling, and hence adopted the dress and mode of warfare so characteristic of the Zulus.

Looking about for the most suitable fields for their destructive genius, one party pitched upon the Rufigi, and another on the Rovuma, where the people are numerous and by no means brave. The result did not belie their foresight. They swooped over these populous and fertile districts, like a destructive plague, and though few in number, yet carried everything before them. Thousands upon thousands were killed, and unknown thousands found their way into the coast slave markets. Tribes were scattered to the four winds of heaven, and large areas of the most fertile and productive land in East Africa were laid utterly waste. Those, indeed, were palmy days for the slave trader, when negro humanity was a drug in the market, and men and women could be got for two or three yards of cotton. It was a matter of small consequence to the trader how many died on the slave path. There were always plenty to fill their places, and in these great newly-made jungles frightful forced marches had to be made, and no delay could be tolerated. If a man became lame, and could not get on, or sank down from starvation, disease, or ill-treatment, the best way for both the trader and the

slave was for the former to send an axe through his skull, and hurry on. Such was the Kilwa route in those times, when it would take about a dozen slaves to make the value of a sheep or goat. Now matters are changed. The slave has become a valuable animal, for which a considerable sum is given, and on which an immense profit can be realised. He is therefore moderately well treated, better fed, and rarely killed when he should happen to commit the crime of being too ill to move on. Philanthropists at home are given to make it appear that the land traffic is as bad as ever, though the sea traffic may be practically stopped. But they forget the effect that the latter fact has upon the former, raising their value, and in various other ways compelling the trader to treat his human live-stock with as much consideration as possible. It should, therefore, not be forgotten that the stoppage of the sea traffic has also to a large extent stopped the horrors of the land transit.

To return, however, to the Maviti. The ravages of this tribe are now, however, practically things of the past, though still a hazy undefined feeling of fear hangs over the country, living as the people do in a chronic state of belief that the Maviti are always preparing for a renewal of their raids.

His Highness the Sultan sent an embassy to the Maviti, and made them understand that their doings could not be tolerated any longer. Since then they have returned to their original occupation of cultivating the soil.

These Maviti or Waninde do not tattoo themselves or wear the pebele. They are very dark and of a low type. Their dress usually consists of a small piece of cloth held up by a waist-band. Their arms are the stabbing-spear, assegais, knobkerry, and shield. Their houses are built in all sorts of East African styles. They do not aggregate together, but prefer to live in small villages, long distances apart. As far as we were concerned they were quite friendly.

The Wahyao next require our notice. I have adopted Burton's original spelling of this tribal name as better conveying the pronunciation most in vogue than Wayao, which has been of late adopted. This tribe occupies the country surrounding the Upper Lujende and bounded on the west by the southern part of Nyassa. It has at one time been a very populous and powerful tribe, but is now like other tribes in this region, shorn considerably of its original proportions by the irresistible onslaughts of the Maviti and of the even more dreaded Makangwala, from the mountains to the west and north of Nyassa.

The Wahyao are perhaps without exception the most industrious and energetic people to be found in East Africa, rivalling the Wanyamwesi in these particulars and excelling them in intelligence and trading capabilities. The best Wangwana or Coast free porters have originally been brought as slaves from the Yao country. Nearly all my best men, with Chuma at their head, are Wahyao, and the experience of many

other travellers has been the same. Physically they are superior to any of the other Rovuma tribes. They do not wear the pelele or tattoo themselves. They are cleanly in their habits and tend generally towards the adoption of Coast customs. Their houses are large, clean, and unusually well built. In customs, language, and manners, they differ from all the neighbouring tribes with the exception of the Makua, who in some respects resemble the Wahyao, though different in others. Their most promising trait is their eagerness to trade and their love of visiting the coast. Their business capabilities are very high, and they may be said to be to Nyassa what the Wanyamwesi are to Tanganyika and Victoria Nyanza. Unfortunately, however, their country is not blessed with any natural wealth, so that they have to depend entirely upon ivory and slaves, which they gather from the greater part of the Nyassa region. Indeed, this desire to trade has made them the greatest slave producers we now have in the Nyassa and Rovuma districts.

The slaves are chiefly obtained by wars among themselves, or with neighbouring tribes, and an extensive system of kidnapping. Each year every village, great or small, sends its caravan of slaves to the coast, and in the months of July, August, and September, the traffic is still very great. At a rough guess I should say nearly 2000 are every year brought down from the Wahyao alone. Three caravans I met averaged 150 slaves each, and I heard of a number of smaller ones. What, however, impressed me much was the evident absence of the dreadful cruelties usually supposed to accompany these caravans. It is true, however, that the slave stick for the men and refractory women is still a necessity of the trader.

Perhaps few better places could be found than the Rovuma basin for studying the frightful effects of the slave system; tribes scattered to the four winds of heaven, and almost annihilated, remnants of such compelled to live miserable lives on rocks and wretched little islands, continued civil war, the absence of all confidence between the various villages, immense tracts of country laid waste, and other evils of equal magnitude.

There are many colonies of Wahyao all along the Rovuma, and wherever they have settled they have become the chief power of the district.

The Makua are another tribe of considerable importance. They occupy the country between the Lujende and Mozambique, having the Mawia and the Matambwe on the north and the Wahyao on the west. They have always been considered a dangerous and exclusive tribe, but evidently on mistaken grounds. I was everywhere received cordially, and the Rev. Chauncy Maples and A. C. Goldfinch, whose tracks I crossed, marched right through the country from the Rovuma to the Mozambique coast without hindrance or trouble. The Makua do not tattoo themselves so lavishly as the Makonde, though their women wear the pelele.

Their distinguishing characteristic is a horseshoe-shaped mark on the brow, over the bridge of the nose.

The Makua women seem to occupy a very independent position, and advocates of women's rights might take a few hints from them. Thus, each wife has her own hut, with everything she possesses, at her own absolute command. She has her own plantations, and the food she cultivates she may sell or do what she pleases with, and it is only of her own good pleasure if she gives or cooks her husband any of the produce of her plantation. If she is divorced she retains all her property and all her children. It will thus be seen that the husband is here the principal object of pity, occupying, as he does, only the position of father of the family. Next to the Wahyao the Makua occupy the first position in industry, intelligence, and business capacity.

A few words on the Mawia, and I have finished. This tribe is better known as the Mabiha, but I fail to understand why, as it is a term I have never heard among the Rovuma natives, who invariably speak of the Mawia. I therefore adopt the latter as the more correct. They are specially distinguished by the fact that the men as well as the women wear the pelele. They tattoo themselves like the Makonde. They are remarkable for the extreme slenderness of their well-made figures. Their only dress is a single strip of cloth.

They are noted as the most exclusive tribe in East Africa, as even the Arabs have as yet been unable to penetrate beyond the outskirts of the country. Their country is like Makonde, and the demand for rubber and copal is slowly breaking down the barriers which exist, and gradually bringing them into communication with their neighbours. Occasionally a few of the tribe find their way to the coast to trade. On my way to the coast I saw them frequently, and was even able to photograph one of the chiefs.

They are said to live apart from each other, not forming villages. There are few roads, and these hardly passable. They are described as being very treacherous, and difficult to deal with.

Makua Land, between the Rivers Rovuma and Luli.

By the REV. CHAUNCEY MAPLES, M.A.

(Read at the Evening Meeting, January 16th, 1882.)

Map, p. 128.

NEARLY two years ago I had the honour of reading before the Society a paper on "Masasi and the Rovuma District"; I now desire to give some account of a journey I have since made, for missionary purposes, in the unexplored country lying between Masasi and Mozambique, a wide tract at present almost an uninterrupted blank on our maps. The

journey occupied two months and a half, and was taken in company with the Rev. A. C. Goldfinch and ten of our own Masasi men as porters. With this little band we travelled in safety and comfort over 900 miles of country, and did our best to lay down our route as correctly as was possible with a compass as our only aid to calculations. Our plan in estimating distances was to time by a watch the exact number of hours and fractions of hours we walked each day, counting an average of three miles (English statute) per hour: then, in laying down this distance on the map, we took off one mile in four as an average for the winding of the path, including also the reduction of the statute to the geographical mile: this average we noted only when the path took the same direction throughout the day, and was not affected by long curves round hills and the like, when, of course, a different allowance was made. In the whole distance from the point at which we left the Rovuma to the mouth of the Luli—travelling by a very circuitous route in order to visit the headquarters of the Makua tribe in the land of Meto—we found we had miscalculated some 20 miles. That is to say, when we found ourselves on the coast at Luli, according to our reckoning we were still some 20 miles from it, this error being almost entirely an error of longitude. From these observations it will be seen how far the accompanying map may be taken as approximately correct.

I left Masasi on June 13th, and early on the 15th reached our station at Chilonda or Newala, as it is more usually called. Here I was joined by my colleague Mr. Goldfinch, who set out with me the following day. On reaching the Rovuma we walked along its northern bank for some six-and-twenty miles in a north-easterly direction till we arrived at the Maviti towns of Mkula and Mkombota. These Maviti, it must be borne in mind, are known by many names; they are, in fact, the same people as the Wandonde, the Mazitu, and the Mangone. In my earlier paper I explained fully who they are, and the relation they bear to the Maviti of Lake Nyassa; it is not necessary, therefore, to repeat what has already been said there about them. After staying two days with these people, we forded the Rovuma close to their towns, and on the south side of it came very soon to some miserably built Matambwe villages. The Matambwe people, it may be noticed, are fast becoming extinct; as far as we know, they exist nowhere save in this part of the Rovuma valley, and even here are almost merged in the larger Makonde tribe. They live for the most part upon fish, cultivate no millet or other cereal, but occasionally buy these for salt, which they are diligent in extracting and preparing. A deep sluggish river, called the Mtumbwi, over which we were ferried by one of their party, runs close to their villages. After crossing this stream we began to mount the hills, and entered the village of a Yao named Ntiaka, who lives just above the river Lidede, abounding in fish and crocodiles. At this point we were, I believe, scarcely more than one day's journey from the little

lake Nangadi, noticed by Livingstone in his 'Last Journals,' and laid down on his map. We had hoped to strike a direct S.S.W. course from Ntiaka's, passing through the very middle of the Maviha country to the river Msalu, and thence in the same direction to Meto, for the capital of which we were chiefly bound. This, however, we found impossible. No road existed there, we were told. Besides, the Maviha are said to be so fierce and inhospitable to all other tribes, that no one dares to pass through their country. Very reluctantly, therefore, we were compelled to be content merely to skirt their country and to retrace our steps, gaining only a very little distance to the south, until we had reached again the longitude of Newala, which we had left a week before. We, however, managed to see something of these shy Maviha folk, for at the end of a very long day's walk from Ntiaka's, we marched into one of their towns. It was built in circular fashion, with a population of about sixty souls, and surrounded by a thickly planted "boma," through which on the south side there is a long passage and gateway leading into the interior of the town. The next day we passed in succession upwards of a score of these villages, and from all of them large numbers of people issued to stare at the white strangers as they passed. In the evening we halted on the last spur of the Maviha hills, and slept in the last of their villages. Our course still lay for several days almost due west, and nearly parallel to the Rovuma. We crossed two rivers, the Mparahanka and the Matiu, both of which rise in the Maviha country, between the Msalu and the Rovuma, and then taking a bend round a conspicuous hill named Nambiti, our path deflected to the south-west, and brought us to a group of Makua villages, presided over by a churlish man named Mkonona. He, however, did us one good turn, in that he warned us to leave the road by which our guides were taking us, and pointed out another by which we were able to arrive in Meto in a far shorter time than we should otherwise have done. The chief interest of our journey, too, is due to his advice, for the route he showed us took us to the headquarters of the Maviti, and enabled us to determine pretty accurately the present location of this East African robber band, as well as to obtain an interview with them which we trust will lead to a more peaceable state of affairs in a country that has of late been much disturbed by their raids.

Acting on Mkonona's advice then, we took the path that led us in a due southerly direction, and for five weary days walked on through a most dreary and uninteresting country, meeting but few people and seeing absolutely nothing that calls for remark. On June 30th we crossed a fair-sized river called Mwiriti, on the other side of which we soon came to signs of cultivation, and once more found ourselves amongst Yaos. Passing quickly through their villages, another 30 miles brought us to Nchine's town. This chief, exceedingly pleasant in manner and most hospitable, has made over the government of the district to a

younger relative, who with the authority has also taken the name which Nchine formerly held—that of Chivaru—and lives where the Chivarus have lived from time immemorial, by the side of a lofty granite rock visible for many miles round, and known as Nikoche. I place his town in latitude $12^{\circ} 25' S.$ and longitude $38^{\circ} 28' E.$, which I venture to think may be taken as approximately correct. Chivaru has chosen a fine position for his town. At the back of it Nikoche towers majestically, while other tree-clad crags and rocks bound it on all sides without shutting it in or preventing fine views down the slope to the distant “barra” beyond. We marched up to Chivaru’s “baraza” on Sunday morning, July 3rd, and found there some 150 people, full grown and stoutly built Makuas, with perhaps a small admixture of the Maviti element, waiting for us, having heard overnight of our arrival at Nchine’s.

After spending the morning in preaching to him and his people, and holding our Sunday service, we afterwards climbed one of the neighbouring rocks to get a view over the country. Wherever the eye rested, the character of this desolate-looking region (for Chivaru’s town and its immediate neighbourhood is as an oasis in the desert) was the same—one vast waste of stunted dried-up forest, with here and there great boulders of gneiss standing out against the sky in a hundred strange fantastic forms, some bare and others, less precipitous, covered with trees. To the south-west we descried the distant hills of Meto, to the W.N.W. the great hill known as Makanje, while far away to the north and north-east we fancied we could just make out the faint outline of the Maviha hills. Everywhere we noticed the bare, arid, unproductive-looking nature of the ground, as it were a thin crust of earth scarcely covering the solid rock in parts, while here and there only it ran into greater depth, allowing the cultivation of millet and Indian corn.

In this unpromising-looking locality, and with the town of Chivaru at Nikoche as their centre, the wild wandering Maviti are for the present established. Chivaru himself was most anxious that we should parley with these troublesome subjects of his, of whom in truth he seemed to be in mortal dread. He extorted a promise from us to stay with him on purpose to see them, and bade us speak out boldly to them on the subject of their recent extravagances. Ours being a mission of peace, we were of course very happy to accede to his request, and in due time the Maviti made their appearance. As we sallied forth from the house that had been placed at our disposal to meet them, we saw about twenty men of different ages, some of them mere youths, advancing in a seemingly menacing attitude, brandishing their spears and covering their bodies with their great shields. On seeing us they at once began the Maviti war-dance, and went through some of the strangest evolutions I had ever witnessed. They uttered terrific whoops,

leaped in the air, then seized their assegais between their teeth, and anon poised them, making a feint of casting them at us. Then, thrusting their tongues into their cheeks, they yelled hideously, and rushed round us with vehement gesticulations, whooping all the time.

At length there was a lull in these strange manœuvres. Chivaru, Nchine, and ourselves sat down in the chairs of honour in the "baraza," while these wild warriors laid down their shields and assegais, and grouped themselves on the grass under a tree a few yards from where we were seated. Our parley then began. Chivaru first was approached by their spokesman, who in somewhat angry tones demanded of him the news of his guests and the reason of our visit. The others, much excited by their war-dance, wherein some of them appeared to us frenzied, applauded, and Chivaru stood up to reply. He spoke in the Donde language, but we gathered that he very carefully told them that our visit was one of peace, that we were Englishmen and not Banians, Arabs, or even Portuguese, and that we had already counselled him and his people to give themselves to the arts of peace. He looked very stately and king-like as he walked in his grand clothes up and down before them, delivering himself all the while in telling periods. When he sat down, I arose, declared the truth of his description of us, and spoke to them for twenty minutes on the subject of our doctrines. Not at all interested in what I said, but merely wishing to know briefly the main purport of our appearance amongst them, they broke into my sermon by a fresh outburst of warlike demonstrations. This I took as a sign that they considered my part was done, and wished others to speak. I noticed all the while, that Chivaru, Nchine, and the other elders were by no means at their ease, and even appeared to be doubtful as to the issue of this strange interview. More words followed from several other speakers, and then, towards sunset, Chivaru called me aside and said the warriors wanted to go away, but that I should have to give them something for their chief, and something for themselves all round, as a kind of "black-mail." Feeling sure that this was no *ruse* on Chivaru's part to get cloth from us, but on the other hand that he really was more or less frightened of these people himself, I gave the cloth, and with some satisfaction saw them depart after shaking hands with them all, and being assured that we were now free to pass through the country unmolested, and that our lives and property would be respected.

The history of these Maviti settlers at Nikoche is as follows:—Four years ago a roving band of Wandonde or Waninde (*alias* Mwangone, *alias* Wangindo, *alias* Maviti, *alias* Mazitu), who had originally been a portion of the East Nyassas Maviti, who in their turn had been associated with the original Maviti, or Zulus, of those parts, having harried the people about Kilwa and the north, passed south, and came to Chivaru to treat with him as to peace or war. The issue was, that they bent their bows backwards, which is the recognised sign of a treaty of peace, and declared

their wish to live in the adjacent country in amity with him and his people. They have not at present actually broken that treaty, but they claim to keep to their marauding habits, driving away or killing all chance strayers into their country, robbing and dispersing Yao caravans, making raids upon the coast districts, and sometimes even stealing flour, fowls, and goats from Chivaru's people. Chivaru seems unable to keep them in order or to restrain them to any very great extent, though the only way to obtain a safe passport in travelling through the country is to appeal to him and meet these Maviti as we did, at his town, and pay for one's footing.

Fifteen miles south-west from Chivaru's we arrived at the river Msalu, called by Makuas Mhalu and at the coast Mosala. I place our crossing in latitude $12^{\circ} 40'$, longitude $38^{\circ} 25'$. Its width at this spot is 40 yards, and we found it nearly dry when we passed over its level bed of gravelly sand. With its windings the river may be here 200 miles from the mouth, where it runs into the sea not many miles north of Ibo. It is said to take its rise in the mountain ranges near the eastern shore of Nyassa.

Twenty miles from this river we entered a thickly populated district where Makua villages were closely clustered at the base of a granitic range of hills called Nikokwe, whose highest peak I calculated at 4000 feet above the sea-level. In reaching Nikokwe we were said to have entered the land of Meto, and from this range of hills on to Mwaliya's—the Meto capital—we were nearly always passing through villages and fields. It was here that we began to notice the very extensive cultivation of the cashew tree, from whose fruit a very strong spirit called "arripa" is distilled. It is said that when the fruit is in season all the people give themselves up to one long course of intoxication, during which all kinds of deeds of violence are the order of the day.

On July 11th we crossed the Mtepvesi (Montepes) river. It was quite dry at this season, the channel deeply cut, and the breadth only about 10 yards.

The next day we started in the morning with but six miles between us and the town of the great head of Meto and the Meto Makuas—Mwaliya. We stepped out briskly through very pretty country, where no trees but the mango, the cashew, and the coco-nut palm were allowed to grow, into such an advanced state of cultivation has this most charming district been brought. Our morning's walk took us through a beautiful valley some 8 or 10 miles broad, with a range of hills on either side and a wide expanse of forest beyond, where the hills trend away into the champaign country to the west. The hills lay east and west, and at the end of them is situated the capital of all Meto—Mwaliya's town, with the name of the sultanhip, "Mkaya." When we arrived at the house of Mwaliya, the great man kept us waiting a full hour before he would see us, during which time a salute

was fired off in our honour. To our intense surprise we found Mwaliya himself a mere stripling of nineteen years or so, very drunk, and very much excited at receiving English visitors. He was very voluble in his liquor, and poured out to us in hiccupping accents tales of his power, and twenty times over told us he was "Sultani Mwaliya"—"Mkaya," &c. &c. When he had amused himself in this way for some time, he went to drink again, and then sang childishly to the notes of an old concertina which he feebly fingered. A number of toadies and minions stood by and laughed at his drunken freaks and frolics, and ever and anon repeated his name "Mkaya" to him in a fawning, crying way that disgusted us.

While we were with him a very large slave caravan, numbering 2000 souls in all including leaders and ivory carriers, arrived from Makanjila's, *en route* for Kisanga on the coast. These people we actually met afterwards at Kisanga, where in a most open manner, as if in no sort of fear of Portuguese authority, they were walking about the town and letting the slaves wander about as they willed.

All the houses in Meto are round, being built with walls of a particular kind of grass closely bound together with circular strips of bamboo encircling the house, and tied each about a foot from the other; the grass has a firm, strong stalk, and grows luxuriantly throughout Meto.

We noticed the air here as being very keen and fresh, a fact accounted for by the elevation of the district, which is 2300 feet above the sea-level. The latitude of the Meto capital I have judged at about 13° 25', and the longitude 37° 58'.

We were very anxious to pursue our journey from Meto in a direct line to Mozambique, so as to visit the fierce branch of the Makua tribe known as Walomwe, but my ten followers, for whose safety and protection I was responsible, were unwilling to be exposed to the dangers and risks of the road we wished to take, and therefore this route was abandoned. In giving up this route, however, we lost the opportunity of testing the native report of the existence of a snow mountain which is said to lie about half-way between Meto and Mozambique. I do not at present myself doubt the natives' story, for we found it corroborated on all sides; all the Meto people speaking of the mountain Irati in the same terms, and indicating the same spot when I asked as to its whereabouts. What I was told then is this—that 4½ days (i. e. 130 miles) from Mwaliya's, one comes to the mountain Irati, that in very clear weather its white peak is visible from Mwaliya's to the S.S.E., that in the hot season its top is seen to be "split up" (that is, rifts appear in it), and rivers of melted snow flow down into the valleys below. Characteristically the Makuas add, "Irati goes up so high that when you see the top you see no further—beyond the top, there is a space of a few feet and then there is God—there are no clouds, no sky above it." It

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— — — — — of lofty mountains of which
— — — — — any ones known—a chain of
— — — — — Somali-land in the north, but
— — — — — of the two already known to
— — — — — that I have not seen Irati.
— — — — — some expense in getting out of
— — — — — Mwaliya; but at the last he
— — — — — who took us to the coast at Luli.
— — — — — occupied a fortnight, was almost
— — — — — monotonous path through stunted
— — — — — easterly direction. Neither do our
— — — — — Ibo call for any special remark.
— — — — — Newala and Masasi, again crossing
— — — — — through some very large Makua
— — — — — remaining part of our journey will
— — — — — map, where the line of population is also

— — — — — brought to light the fact of the unpro-
— — — — — everywhere, of the scanty population, and
— — — — — spots of interest on which I have dwelt in
— — — — — desert. There is certainly nothing in the
— — — — — large tract of country to recommend it either
— — — — — the trader, or the traveller who travels in
— — — — — fine scenery. Bare and uninteresting, mono-
— — — — — verdict on “Makua Land between the rivers

ITINERARY.

	Bar.	Miles.		Bar.	Miles.
	2700	..	July 6. Nikokwe	.. .. 2500	15
	2100	18	.. 7. Kawariya's	.. ..	15
	1980	18	.. 8. Mwenja's	.. ..	15
	2670	13	.. 11. Mkaya	.. ..	24
	1790	14	.. 12. Mwaliya's	.. ..	5
	1400	13	.. 15. Mpupua's	.. ..	3
	1400	20	.. 16. Forest	.. ..	14
	1630	12	.. 17. Ditto	.. ..	5
	2600	16	.. 18. River Namanka	.. ..	10
	..	13	.. 20. River Mkaluma	.. ..	12
	..	8	.. 21. Forest	.. ..	14
	..	..	.. 22. Ditto	.. ..	11
	..	..	.. 23. Ditto	.. ..	20
	2000	16	.. 25. Mwigama's	.. ..	17
	2100	21	.. 27. Forest	.. ..	18
	2130	10	.. 28. River Luli	.. ..	11
	..	17	.. 29. Luli (town)	.. ..	17
	..	11½	.. 30. In the fields	.. ..	6
	2120	20	.. 31. Mkufi	.. ..	15
	2350	15	Aug. 1. Mrebwe	.. ..	11
	2500	15	.. 2. River Meluza (in)	.. ..	16
	..	5	.. Fomba Bay)	.. ..	..
	..	19			

	Miles.		Miles.
Aug. 3. In the dhow	16	Aug. 15. Mchilimba's	12
" 4. River Tari	9	" 16. Forest	16
" 5. Kisanga	30	" 17. River Matiu	20
" 6. Ibo	10	" 18. River Mparabanka	15
" 7. Kisanga	15	" 19. Kaluma's	13
" 8. Karawa's	15	" 20. Rovuma, south	16
" 9. Mwojia's	12	" 21. Ditto, north	2
" 10. Namaru	18	" 22. Kilonda	18
" 11. Makonde village	16½	" 23. Mkoo	10
" 12. Nasombe's	13	" 24. Forest	23
" 13. Forest	19	" 25. Musasi	11
" 14. River Msalu	5		

The PRESIDENT, in introducing the two preceding papers, expressed his regret that the authors were not present, for the Society would have been glad to meet again two gentlemen, Mr. Joseph Thomson and the Rev. Chauncey Maples, who had contributed so much to the extension of geographical knowledge. But that regret was very much mitigated by the fact that the first paper would be read by Sir John Kirk, whose name was well known and honoured by all geographers. He was the friend and companion of Livingstone in one of his most important expeditions, and was known as a gentleman who, in his capacity of H.M. Consul at Zanzibar, had more than any one else promoted exploration in Eastern Africa. There had been no expedition during the last twelve or fourteen years from the Eastern Coast to the interior, the leaders of which had not acknowledged in the warmest terms their gratitude for the services rendered by Sir John Kirk; and every member of the Council of the Society regarded him as a person who could always be depended upon to do his utmost to promote the interests of geographical science in Africa. They had never felt the slightest reluctance in applying to him, and the assistance they had received from him had been perfectly invaluable. Mr. Maples was a member of the Universities Mission on the East Coast. He had on a previous occasion contributed a paper to the Society. Mr. Penney, the Secretary of the Universities Mission, and a personal friend of Mr. Maples, would read his paper that evening.

After the reading of the papers—

The Rev. HORACE WALLER said that one of the greatest factors in the restoration of that part of Africa to something like the state it was in five or six centuries ago, must be the opening up of trade. When Sir John Kirk and himself were on the Zambesi and the Shiré, indiarubber was only used here and there, and then merely to make toys for the children in the villages; but the trade had developed to a most extraordinary extent. Sir John Kirk, with his great knowledge of botany, might be able to give some additional information on that point, and the Meeting would be obliged to him if he would do so.

Sir JOHN KIRK said that the papers which had been read represented the country described as most unpromising, so far as natural capabilities were concerned. One writer spoke of it as similar to an Arctic region newly emerged from beneath a glacier; while the other condemned it as bare and uninteresting, monotonous, and dreary. Still he thought the riches were there. A singular instance of that was to be found in the development of the indiarubber trade. When on the Zambesi he had seen the plant growing abundantly but neglected. After he was appointed to Zanzibar he did his best to encourage the collection of indiarubber. The slave trade, however, at that time made it almost impossible to collect it. It was necessary that people should be sent out into the forests to tap the vines; but that could not be done whilst they were liable to be captured and carried away as slaves. In 1873 the export trade to foreign countries in slaves was completely stopped.

Then the natives began to work the indiarubber, and now it would be found by the returns of the Zanzibar trade that about 200,000*l.* worth of indiarubber was collected annually, recouping the traders and the Sultan for any loss they might have sustained. The last time he was at Makindany he was told that 40,000 *frasil* (of 35 lbs. each) had been shipped in one season. The slave trade to Arabia and Persia from Zanzibar had been completely stopped; the slaves now brought to the coast were only taken to the islands of Zanzibar and Pemba, or used on the coast where there was at present a great demand for labour. The Rovuma was near the boundary line, and the slave-traders could play fast and loose between the territories of Zanzibar and Portugal.

Mr. F. GALTON said that since the beginning of the present year there had been two very remarkable contributions to the mapping of those regions. The first was the publication of the first part of the long-promised map by Mr. Ravenstein, issued under the authority of the Science Committee of the Council of the Society. On that map was inscribed every fact that travellers in those parts had recorded. It was a wonderful illustration of Mr. Ravenstein's industry, and would be most useful to all African geographers. The other work to which he alluded was the relief map of Eastern Equatorial Africa exhibited at the present meeting, by Colonel Grant. It was calculated to give quite a new idea of the country, even to those who were well accustomed to the ordinary maps of the region.

Colonel GRANT, in explanation of his model, said that about a year and a half ago he thought sufficient material had been acquired to produce a map of Africa in relief, and Mr. Bates recommended him to go to Professor Etheridge, of the School of Mines, Jermyn Street, who said he knew of only one person who would be likely to produce such a map properly, namely, Mr. Jordan. He (Colonel Grant) collected all the information he could from the library and other sources, and placed them before Mr. Jordan, who while recognising the insufficiency of the data, set about the work, and produced the beautiful model now before the Meeting. He (Colonel Grant) wished the model to be constructed of some material which would be light and not liable to crack—this was effected by Mr. Jordan placing alternate layers of blotting-paper and glue upon a model of clay, and the result was now to be seen by the Meeting. The snowy peaks of Eastern Africa rising to a height of 19,000 feet, the highest waters of the Nile, the Congo, and the Zambesi, and the crags overhanging the Albert, Tanganyika, and Nyassa lakes, could be traced here in a manner which could not possibly be shown upon an ordinary map.*

* Mr. Jordan sent to Colonel Grant the following explanation of his mode of constructing the model:—

"The extent of country modelled represents an area of 1,448,380 square miles, or nearly twelve times the area of the British Islands. It is comprised between the parallels 5° N. and 15° S. lat., and between the meridians 26° and 41° E. long., including, on the east, the shore of the Indian Ocean, showing the islands of Zanzibar, Pemba, and Monfia; on the west it includes the town of Nyangwe, with Gondokoro on the extreme north, and reaching southwards as far as the south end of Nyassa and Lake Shirwa.

"The horizontal scale of the model is 25 miles to 1 inch = 1:1,584,000, and the vertical scale = 1:60,000 or 5000 feet to 1 inch. This exaggeration, which is equal to about twenty-six times the horizontal scale, was found necessary in order to show, although in a small degree, the differences of level of the great lakes, which form the principal features on its surface.

"Before commencing the construction of the model, it was necessary to prepare a suitable map of the district to the required scale. On this map was drawn a series of contour lines at intervals of 1000 feet of vertical height—a work of much labour, owing to the scarcity of information for such a purpose.

"The next step was to transfer these contours, at their proper elevations, to some

The PRESIDENT, in proposing a vote of thanks to the authors of the papers, said that although the expeditions described had not embraced so wide a tract as those of Livingstone, Cameron, or Serpa Pinto, they had the special advantage of directing closer attention to the geographical details of a smaller area. In the longer journeys it was difficult to dwell minutely on the actual condition of the natives, or the character of the country so rapidly traversed; but when attention was fixed on a small area, it was easy to enlarge upon both those matters. With respect to Mr. Thomson, many present would remember his first appearance before the Society. Under the circumstances in which he was called upon to take charge of the expedition

plastic material which could be moulded to represent the natural undulations of the country. This was done by means of an apparatus devised by my father, Mr. Thos. B. Jordan, much on the same principle as his patent wood-carving machinery. It consisted of a wooden frame or box lined with sheet zinc, of the size and depth of model, and filled with potters' clay. The map was placed on the same table by the side of it, with an iron rail between them which was considerably longer than the map. This formed the guide on which a large T-square rolled over both map and clay in a north and south direction, while the blade of the square, which crossed from east to west, was so constructed as to receive and guide a second slide furnished with two tracing points capable of moving in a vertical plane; these points were distant from each other by the width of the map. By this arrangement two motions were secured on lines east and west and north and south, so that the tracer could be placed on any point of the map, while the other point or cutter would be over a corresponding point of the clay. The vertical scale of the model was engraved on the stem of the cutter in order that its point might be fixed at any required elevation above the sea-level of model. It will be seen that this apparatus enabled us to copy accurately the contours of the map at their proper elevations in the plastic clay, and from this to model the undulations of the country to agree with the best data at our disposal.

"Having thus arrived at the form of the surface in the clay, a hard mould was formed from it by taking a cast in plaster of Paris. In this mould the model was produced by covering its surface with repeated layers of paper and glue, forming together a hard and permanent copy of the original clay model, in thickness about one-tenth of an inch.

"As soon as this paper cast was sufficiently dry, its surface was coloured in oil to represent, in a general way, the natural tints of the country; the rivers and other features were then indicated, the names of places, &c., added, and the lines of latitude and longitude drawn at every degree. It was a matter of some difficulty to draw these lines correctly, and necessitated the construction of a special apparatus which was made by setting up two columns of wrought-iron tubing from floor to ceiling of my study and fixed at a convenient distance from the wall, against which the model was placed, resting on the floor. A horizontal shelf or table was made to slide up and down these columns, to which it could be clamped at any required point; this shelf served as a guide on which to move the scribing gauge holding the drawing pen, so as to admit of drawing the lines over the undulating surface of the model without risk of departing from the true line. The lines were drawn in gold paint, which showed more distinctly than any colour over the various tints of the surface.

"The model is mounted in a plain oak frame, the top surface of which represents the sea-level. The size of the model is 4 feet $7\frac{1}{2}$ inches \times 3 feet $5\frac{1}{2}$ inches.

"It is not pretended that this model gives more than a general idea of the principal features of the country, as far as information is available. If, however, a plaster of Paris cast were prepared from the original mould, it would form a groundwork which might be altered and added to, as fresh explorations are made; it would then become a more accurate and instructive representation of the country.

"JAMES B. JORDAN.

"Lieut.-Col. JAS. A. GRANT, C.B.

"STAINES, December 30th, 1881."

that was despatched under the command of Mr. Keith Johnston, nineteen out of twenty young men would have returned to the coast; but he continued his long and arduous journey with great success. On his return to England he availed himself of all the means at his disposal for increasing his scientific knowledge, so that he might become an accurate geographical observer, and the paper showed his power of observation and picturesque description. Mr. Chauncy Maples had fully sustained his reputation as a vigorous and graphic writer. The authors of both papers had abstained from exaggeration, and confined themselves to careful and truthful observations.

GEOGRAPHICAL NOTES.

The Jeannette Expedition.—Little additional information has been received during the past month regarding the survivors of the *Jeannette* Expedition, or the events of its two years' cruise in the Polar seas. According to one account, transmitted by a St. Petersburg correspondent to one of the London daily papers, and said to have been received from one of the survivors at Yakutsk, the vessel was caught in the ice on the 1st of October, 1879, and has since drifted about at the mercy of the winds and currents until she was abandoned in June 1881. No tidings of the missing second boat have yet been received, nor of the safety of Lieutenant De Long, Dr. Ambler, and the other survivors of the first boat, who landed at the northern mouth of the Lena in a suffering condition, and were left there by two of the crew, when the latter proceeded up the river in the boat to procure succour at the nearest settlement. It would be a great relief to hear of the safety of the gallant commander of the expedition and the scientific staff, but the latest telegram received up to the time of our going to press increases instead of allaying anxiety. It is to the effect that the chief engineer, Mr. Melville, had been in search of them along the eastern side of the Lena Delta, without finding them, although he had found many articles belonging to them at places where they had rested. The survivors in Mr. Melville's boat, according to the same telegram, had left Yakutsk for Irkutsk.—With regard to the steps taken by the Society, before the news of the *Jeannette* was received, in urging the despatch of a Search and Relief Expedition to the shores of Arctic America, the following reply from the Colonial Office has been received to Lord Aberdare's letter on the subject* to Lord Kimberley:—"Downing Street, 3rd January, 1882. Sir,—I am directed by the Earl of Kimberley to acknowledge the receipt of Lord Aberdare's letter of the 23rd November, suggesting that this country should take part in the search for the missing American vessel, the *Jeannette*, by organising a land expedition in British America. The news which has lately been received from Russia respecting the *Jeannette* and her crew renders it now unnecessary

* The letter to which our President alluded in opening the present Session, 'Proceedings,' 1881, p. 748.

to consider further this suggestion; but Her Majesty's Government appreciate, as they have no doubt the United States Government will also do, the proposal of the Royal Geographical Society to contribute towards the cost of the expedition, which Colonel Butler, C.B., had expressed his readiness to conduct.—R. H. MEADE. To the Secretary to the Royal Geographical Society."

Russian Meteorological Station at the Mouth of the Lena.—On the 28th of December the expedition started from St. Petersburg which is to found the Russian station at the mouth of the Lena for meteorological, magnetic, and other observations, in accordance with the programme arranged at the International Polar Conference, held at St. Petersburg in August last. Lieutenant Jurgens, of the Imperial Russian pilot service, who has undergone a long preliminary training, is the leader of the expedition, and he is accompanied by M. Eigner as meteorological assistant, and Dr. Alex. Bunge as surgeon and general scientific assistant, as well as by two picked soldiers from Cronstadt, in addition to whom others will be engaged at Irkutsk and specially trained for their duties. The expedition will travel by way of Moscow and Nijni Novgorod to Perm and Ekaterinburg, whence they will proceed by sledges to Tomsk and Irkutsk. At the last-named place they will remain till late in the spring to make their final preparations, and it is stated that they will either purchase or build a vessel at the head of the navigable part of the Lena. As the forest-limit lies far to the south of their future station, it will be necessary for the party to take with them all wood required for fuel and building purposes. Notwithstanding the great difficulties to be overcome in the matter of transport, it is hoped that Lieutenant Jurgens will be able to commence his scientific work at the mouth of the Lena on the first of next August.

Scientific Researches in Alaska.—Acting in co-operation with the Smithsonian Institution, the United States Signal Office a few years ago despatched some specially qualified observers to Alaska to study the meteorology of the region, and at the same time to carry on other scientific work. Mr. E. W. Nelson, a distinguished naturalist, was appointed as one of the party, on the nomination of the Smithsonian Institution, and sent to St. Michael's, a station on Norton Sound, a district of very great interest from both an ethnological and natural history point of view.* Mr. Nelson has spent four and a half years in this part of Alaska, and has just returned to Washington, having been on board the *Thomas Corwin* during part of her late cruise in the Arctic Sea. During his residence in Alaska, Mr. Nelson was, of course, principally engaged in meteorological observations, but we learn from the *New York Herald* that all the time he could spare from this work was employed in making exhaustive researches in the mammalogy,

* Smithsonian Report for 1879, p. 44.

ornithology, and ichthyology, as well as in the ethnology and physical geography of the surrounding region. In the winter months his field of labour was enlarged by extensive sledge journeys, and an employé of the Alaska Commercial Company took the meteorological observations for him at St. Michael's. During the whole of his residence in Alaska, Mr. Nelson took copious notes upon all points of interest, and made a large and varied collection illustrating the fauna of Alaska. He also collected what is probably the largest and most important series extant of Eskimo implements and utensils, with other objects of their handiwork. Mr. Nelson has, besides, made water-colour sketches of the heads of brightly coloured birds, and of the most gaudy sea fish found near St. Michael's, in addition to taking a large series of photographs of the natives and scenery of the country visited by him. During the cruise of the *Thomas Corwin* Mr. Nelson was also able to make considerable additions to his notes and his collections of specimens and photographs. The information which he has obtained respecting the language, manners, and customs of the Western Eskimo, is said to be of great value, and he will be the first writer who has dealt with the subject in the English language.

Expedition to the Chukche Peninsula.—In our June number* we alluded to the departure for New York, in April, of Dr. Arthur Krause and Dr. Aurel Krause, who were commissioned to undertake for the Bremen Geographical Society a scientific expedition to the coast districts and islands of Behring Strait and Sea. Messrs. Krause left San Francisco on June 11th, in the American whaler *Legal Tender*, and were landed at St. Lawrence Bay. After a short stay there, they proposed to visit East Cape and the Diomedé Islands; and then, returning to St. Lawrence Bay, to work their way down the Siberian coast to Plover Bay, which they hoped to be able to leave for San Francisco about October 1st. They appear to have carried out their programme very exactly, for we learn that by a telegram to the Bremen Geographical Society, they announced their safe arrival at San Francisco on November 6th, with good natural history and ethnographical collections. They have visited various points in the Chukche Peninsula, and intend to pass the winter in Northern Alaska.

Caroline Archipelago.—During the past summer Captain William H. Maxwell, R.N., of H.M.S. *Emerald*, in his capacity of Deputy High Commissioner, visited several of the island groups of the Western Pacific, touching last of all at the Caroline Islands. The ship arrived at Kusari, or Strong Island, on June 25th, and anchored in Lélé or Chabral Harbour. Captain Maxwell reports that the island is mountainous, with lofty peaks, some 2000 feet above sea-level, clothed with verdure to the summits; bread-fruit, bananas, &c., grow in abundance, but coco-nuts

* See vol. iii. p. 374.

are far less plentiful than in the low coral islands, and, owing to the bountiful supply of water, they are not so much needed. The ancient walls and fortifications on the small island of Lélé, where the king lives, are very extraordinary. The walls are some 20 feet high, having been in former times probably as high everywhere, and 12 feet thick, and are built of enormous basaltic rocks, which must have been brought from a distance, and have cost much labour and ingenuity to raise them to their present position. Dr. Pease, of the American Mission, informed Captain Maxwell that the king has always lived on Lélé Island, that the population (now about 300) in former days amounted probably to ten times its present amount, and that these forts were built for the royal defence and to overawe the main island. The natives of Strong Island are described as a most gentle, amiable, and intelligent race; they are lighter in complexion than the Marshall Islanders.—Captain Maxwell afterwards visited Ponapi, or Ascension Island, in the Simavina group, the population of which is stated to be 5000. This island is divided into several districts, each of which has its own chief. The natives are particularly pleasant and good-looking; Captain Maxwell thinks they have more refined features than any he has seen, but they are not so well dressed or advanced as the inhabitants of Strong Island—the grass-petticoat, indeed, seemed to be the principal article of clothing. The island is about 14 miles square, and very beautiful, with lofty peaks from 2000 feet to nearly 3000 feet high, which are wooded to their summits, and is surrounded by coral reefs with pretty detached islets; all sorts of fruits and vegetables grow there in abundance. The ruins on the island, according to Mr. Doane, the American missionary, are those of old chiefs' residences, built in days when chiefs were more powerful and the population more numerous than now. They are erected on the reef, and from decay and thick vegetation now form islets, on which grow large trees and very thick underwood. Captain Maxwell's party found in them enclosures within enclosures—on one islet four complete squares one within the other—with walls in some places 35 feet high and upwards of 12 feet thick, built of great basaltic prisms (many of them 12 feet by 2 feet 6 inches), laid regularly tier upon tier; each tier being at right angles to the one below, and the interstices filled in with coral and rubble. Other ruins of a similar kind, Mr. Doane says, are to be found in many places inland.

Umzila's Country.—We are informed that this influential Kafir potentate has received with kindness a party of American missionaries, sent by the American Mission Board of Boston. The reverend gentlemen proceeded thither by way of Inhambane and the east coast. It will be remembered that the Jesuit missionaries who endeavoured to found a mission in the same region, reached Umzila's country by way of the Transvaal. The Americans hope to establish a station at Umzila's chief town.

King Mtesa.—The latest news from Uganda (August 1881) is much more favourable to the prospects of the English missionaries than it has been for some time past, King Mtesa having been much pleased with the account given him by the three envoys of their reception in England in 1880. The return of royal favour has been shown by the grant of houses and land and free permission to mix with the people. Although the envoys were not men of high rank, it is reported they did their work well, and have rendered a truthful account to the king of what they saw. Only two English missionaries remained in Uganda, Messrs. Mackay and O'Flaherty; but others are being sent to join them by the Church Missionary Society. Two members of the same party, Messrs. Pearson and Litchfield, returned to England some weeks ago; the former, whose health is much impaired, has brought home geographical material of great value, which will lead to a much improved map of the western and north-western shores of Victoria Nyanza.

Mr. O'Neill's Journey in the Interior of Mozambique.—Mr. H. E. O'Neill, our Consul at Mozambique, returned at the end of November from his enterprising journey into the interior of Mozambique, which we announced in the January number of the 'Proceedings.*' His paper and map, which have only just reached us, form a most important contribution to our geographical knowledge of this part of Africa. He has made a successful journey of 600 miles through country previously almost totally unknown, and reached a point within sight of the lofty peak Namuli, reported by all travelled natives to be capped with snow. But, unfortunately, the summits of this and the neighbouring peaks were hid in cloud during the brief stay allowed him, and the snow was not actually seen.

Ascent of the Old Calabar or Cross River.—In December 1880, the Rev. S. H. Edgerley, a missionary of the United Presbyterian Church at Creek Town, made a preliminary journey to Umon, some distance up the Cross River, and even obtained permission to go a little way further to Iköt Ana. Similar attempts have been made before, with a view to opening new stations, but have always been frustrated by the conservatism of the Umon people, who would allow no one to pass their town. Encouraged by his success on this occasion, Mr. Edgerley resolved to make a more extended journey in this hitherto inaccessible region, and to push his way still further up the river. Accordingly, he started from Creek Town on February 14th, and reached Umon after two days' heavy boating. After three days' sojourn there, he started up stream again and got to Ana, where on his previous journey he had contrived to establish a friendly understanding with the people. During his present visit he was able to do good service by mediating in an ancient quarrel between the chief and his eldest brother, and no opposition was

* 'Proceedings,' vol. iv. p. 46.

offered to his proceeding on to Akunakuna, the youngest brother of the chief, indeed, volunteering his services as guide and interpreter. After a pull of four hours against stream—the tide not being felt above Ana—Mr. Edgerley reached Okuriké, the chief town of the Akunakuna tribe, where he was well received, as he had sent word of his proposed visit, together with presents for the chief, by some traders whom he had met at Umon. The town itself is about a mile from the landing-place, and the road between, which is 12 feet and, in some places, 20 feet wide, is exceedingly well kept. Okuriké town is situated on a range of hills running parallel with the river, and contains probably some three or four thousand people, being much larger than Umon. The chief industry of the place is the building of canoes—some capable of carrying three tons' weight—which are sold to tribes lower down the river. The chief of Okuriké told Mr. Edgerley that he had been on board the *Ethiopia* when Captain Becroft ascended the river in 1841-2,* but as no one landed anywhere, this was the first opportunity the people had had of seeing a white man.—Mr. Edgerley experienced some difficulty in holding intercourse with the people of Okuriké, as, though his interpreter understood Efik well, he evidently knew but little of the Akunakuna language. The people did not understand Efik at all, and their acquaintance with the Umon language was very imperfect. They do not go down the river beyond Umon, and the Efik people never ascend the river beyond it, so that the two tribes do not meet.—On February 22nd Mr. Edgerley started again to visit the towns higher up the river, and passing a small place called Itu, reached a beautiful spot. The river suddenly widened out to over a mile in breadth along a reach of about 10 miles. On the right bank was the dense African jungle, with here and there an opening showing where inland towns hold communication with the river, while on a steep slope above the left bank there stretched a line of huts about a mile in length, overshadowed by coco-nut and other trees. In these huts were comprised four villages, containing in all a population larger than that of Okuriké. Mr. Edgerley visited the chief men in each village, and walked along the whole line of huts. He learned that the four villages are called Aboni, Ekpesim, Usadja, and Emumuru; from the last-named he crossed the river, and going a short distance higher up, visited a village named Abangwen. This was the furthest point reached by Mr. Edgerley, who at once commenced his return journey to Creek Town, visiting Itu in addition to the places touched at on his upward voyage.

Mean Altitude of the African Continent.—As the result of his researches and calculations, Dr. Josef Chavanne, the well-known Austrian geographer, estimates the mean altitude of the continent of Africa to be 2169·93 feet, thus ~~giving~~ it more than double the mean altitude of the continent of Europe, which M. G. Leiboldt has estimated at 971·41 feet.

* See R. G. S. Journal, vol. xiv. p. 260.

According to M. Chavanne, if the Atlas range were spread over the entire continent of Africa, it would give a height of 85·86 feet only, while the Abyssinian mountain mass would similarly give a height of 79·72 feet.

Père Duparquet's Journeys in Ovampo-land.—In concluding a series of papers in *Les Missions Catholiques* on his further explorations in Ovampo-land and north of the river Cunene, Père Duparquet furnishes some particulars respecting the various tribes, &c., supplementary to the information which we have already given from his former letters and reports.*—In the first place, with regard to the tribes of Ovampo-land, he states from his more extended investigations, that they are sixteen in number, and it will be seen that the names now differ in some instances from those previously given. Of the three groups into which Père Duparquet divides the sixteen tribes, the five in the west are the Ongangera, Ukualuzi (Okaruthe), Ukualukazi, a small tribe previously unknown, Ondombozoro, and the Ovahinga; the last-named live on the south bank of the river Cunene, and rear cattle, being also an agricultural people like the rest of the Ovampo tribes. The six tribes in the centre are the Ukuambi, a rich and powerful tribe, though their territory is not large; the Great Ombanja, or Kuamato, whose fertile country is watered by numerous *omarambas*, covered with forests; Ombalandu, or Orundu-miti, before erroneously separated into two distinct tribes; Onkuankua, a tribe little known by Europeans; Ondongona, who are separated from the Ovahingas above mentioned by the Okipoko *omaramba*, and dwell along the south bank of the Cunene; and the Little Ombanja. The five eastern tribes are the Ondonga, extending as far south as the Otavi copper-mines, of which they contest the possession with the Damaras; Ukuanyama, whose territory stretches from the Cunene to the Okavango, with a population of 60,000; Evaré, Ehanda, in whose country is an iron-mine which supplies the whole of Ovampo-land; and the Kafima. Fourteen of these tribes belong to the Ovampo race, and two, the Ovahinga and Ondongona, to that of the Cimbébas† on the opposite side of the Cunene.—With regard to the tribes on the right bank of the Cunene, those living to the west, between Humbi and the sea, belong, according to Père Duparquet's view, to the race of the Cimbébas, but he is only acquainted with four of them, the Ondongona, Aolé, Ovakiavikua, and the Ovakuanankuari, the last inhabiting the mountains about a day's journey from the Ovahingas. Of the tribes further to the east, Humbi, Ekamba, Omulondo, and Olushéké, Père Duparquet is unable to say for certain whether they ought to be assigned to the Ovampo or the Cimbébas race.

* See vols. ii. p. 629 and iii. p. 43.

† From the name of these people is derived the term "Cimbébasie," by which the French missionaries designate the whole tract of country from the Cunene to the Orange River.

The former, indeed, claim them, but in language and dress they have a strong affinity to the latter, and are probably a mixed race. The other tribes to the north, known to the Ovamos, are the Ongambué (called Gambos by the Portuguese), Kyihita, Hai, Oshipongu, and Oshilengué. —Roads, practicable for waggons, exist in various parts of Ovampo-land, and now that the Trek-Boers have made one from Humbi to Huilla, it is possible to travel by waggon the whole way from Walvisch Bay to the Portuguese colony.—In order to complete the information which he has brought together respecting the country south of the Cunene, Père Duparquet adds some observations on the region lying between Ovampo-land and the sea, which is known under the name of Kaoko. It is bounded on the east by the mountains, beyond which lie the plains of Ovampo-land, and with which commences the broken and rocky region that extends to the coast. The line of demarcation between Ovampo-land and the Kaoko country may be said to start from about the cataracts of the Cunene, and to pass by Ombombo, Shomahahé, Omahama, Okamanya, and Otjitembe, to about Mount Brandberg on the south. With the exception of the coast region which is occupied by Hottentots, the whole of the Kaoko country is inhabited by people of the Cimbébas race, who are locally termed Kaoko Damaras. At one time they are said to have numbered 80,000 souls, but during the past half-century a great portion of the population has, owing to various causes, emigrated either to the north side of the Cunene or to Damara-land. The Kaoko country, though mountainous, affords excellent pasturage, and is well-watered, and in this respect is looked upon as superior to Damara-land. In the last three years it has been several times traversed by Europeans, and some hunters have even taken their waggons as far as the Cunene on the north, but they have found the river impassable for vehicles. The north bank is precipitous and rocky, while the south bank is lined with sand-dunes, which cannot be traversed by waggons. Near the sea, again, owing to the entire absence of rain, it is impossible to find sufficient food for cattle, so that there is no hope of the country there being turned to any account.—With regard to the rivers of the Kaoko country, there is a fairly large stream running between mountains and flowing into the Cunene on the left bank near its mouth; and the other rivers are the Munutum, Nadas, Segomip, Komip, Kuarasip, and Okobarip. None of these rivers run permanently, but water can generally be obtained by digging in their beds, and at their mouths it is found in abundance.

Proposed Removal of the town of Kuldja.—We learn from the St. Petersburg papers that the trading part of the population of Kuldja being desirous of removing into what, under the new Russo-Chinese Treaty, will remain Russian territory, General Friede, at the end of last July, spent some days in seeking for a suitable locality for a new town. He examined the country near the Khorgos (right

bank), Almaly, Chitkohan, Jaman-Bulak, Chijen, and Ussek, and went as far as Borohudsir. The valleys of all these streams, as well as the whole of the country between the Khorgos and Borohudsir rivers as far as the post road, show traces of cultivation in former times. The region is cut up with what were irrigation canals, which could be restored without much difficulty. This is especially the case with a large quantity of land on the right bank of the Khorgos, which under Chinese rule was State property. The abundance of water in the Khorgos and Almaly rivers, and in the other affluents of the Khorgos, that is the Chitkohan, Ussek, and Borohudsir streams, will admit of the whole extent of country between the foot of the mountains and the post road being artificially watered; and the irrigation canals, when once they have been cleared out and repaired, will turn it into a luxuriant oasis in the midst of the surrounding steppes.—At an interview between General Friede and Captain Tikmenef, who is charged with the selection of suitable sites for forts, fortified camps, and other establishments, it was settled that the best place for the construction of a fort on the Khorgos is a spot on the right bank of the river, at the foot of the mountains which command the whole neighbourhood. The economic importance of this place lies in the fact that it would make the Russians masters of the river Khorgos, and give them the power of cutting off its waters from the Chinese irrigation canals. Cossack colonies could be established near the fort and east of the river as far as Akkent. The neighbourhood of what was formerly the small Chinese town of Jarkent is thought to be well adapted for the construction of a town for such of the inhabitants of Kuldja as desire to remain Russian subjects.

Ancient Indian Diamond Mines.—Mr. V. Ball, the well-known Indian traveller and geologist, has recently bestowed some pains on an endeavour to identify the geographical sites of the ancient Indian diamond mines, mentioned by Tavernier during his travels in the middle of the seventeenth century. The three localities mentioned by him, Gani or Coulour in the kingdom of Golconda, Raolconda in the Carnatic, and Soumelpour, have never yet been successfully identified. The first has been supposed to be the modern Gani-Partial, but Mr. Ball with great force shows that Kollur is a likelier spot. Colonel Colin Mackenzie, in a map of the Nizam's dominions, dated 1798, indicates "Coulour" as a diamond mine, and *Kan i*, meaning "mine of," was obviously a prefix and not a proper name. At this Coulour mine, Tavernier states the Great Mogul diamond was discovered. A sketch of this stone side by side with one of the Koh-i-Nur diamond displays considerable similarity, and suggests the idea, which Mr. Ball favours, that the two are identical, but that the former sustained loss by cleavage, and that this accounts for the difference in weight (= about 85 carats) between the two. The next geographical site, Raolconda, is identified by Mr. Ball with Rawduconda in the district of Mudgul in Hyderabad, and the third, Soumelpour, not

with Sambalpur as supposed by some authors, but possibly with Simah an ancient town, remains of which are still to be seen, in Palamow. Simah, Mr. Ball takes to be the same as Semul, the name of the silk cotton tree (*Bombax malabaricum*) which attains an enormous size in that region, and Semul-pur is a very close approximation to Soumelpour. Mr. Ball's last identification relates to Beiragarh, a diamond mine mentioned in the Ain-i-Akbari, which he traces in Weiragurh, in the Chanda district. Nicolo Conti, speaking of a mountain called Albenigaras (which sounds like Beiragarh with the Arabic prefix *Al'*), says that the diamonds were obtained from thence by slaughtering oxen and hurling thither fragments of their flesh. Vultures and eagles carried off the meat from the spot, which is infested by serpents, and diamonds were found adhering to the fragments. This is pretty nearly the same story as that of 'Sindbad the Sailor,' and Marco Polo. Mr. Ball furnishes a plausible explanation of it in the fact that mines were occasionally deemed to be under the tutelary care of Ammawáru, the sanguinary goddess of riches, and that the sacrifices of oxen, &c., and the throwing up of their flesh to be devoured by the fowls of the air, which took place there, were imagined by visitors to be an essential part of the operations for obtaining the diamonds.

Von Möllendorff's Observations on the Great Wall of China.—The Great Wall of China has long been described as one of the wonders of the world, but it was not until the Russian priest Hyacinth, at the beginning of the present century made known his researches on the subject that the popular notion of one continuous and colossal structure, dating from remote antiquity, was fairly dissipated. Dr. O. F. Von Möllendorff, of the German Consular Service in Northern China, has lately contributed the result of his study and observations on the subject, in the shape of a paper which appears in the *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, Heft 1, 1881. Considering the fragmentary character of our geographical knowledge of Northern China, it is not surprising to find the existing information about the Great Wall characterised by similar imperfection; for the most part it consists only of descriptions more or less precise where travellers have taken note of the structure at various detached points along its line. Dr. Von Möllendorff's conclusions differ in some respects from Hyacinth's, whose data and deductions he has had the advantage of considering by the light of later research, so we may confidently regard the present paper as the latest and most authoritative monograph on its subject. Its author points out in the first place that the Great Wall as known to us may for the most part be ascribed to the fifteenth and sixteenth centuries, and certainly under no circumstances can be dated further back than the sixth century after Christ. Mediæval writers give but the very vaguest indication of its existence, and Marco Polo's silence may be explained by the fact that whatever might have been the character of the wall belonging to the region which he must have traversed, it must either have disappeared wholly or in part before his arrival.

Judging from the accounts of travellers and from personal observation, Von Möllendorff distinguishes four different styles in the Great Wall. Two parallel walls of large burnt bricks, capped with bulwarks, and erected to a height of about 19 to 25 feet, on a base about 19 feet in width, composed of square granite block. The interval is filled up with clay, stones, and fragments of bricks, and at irregular

distances rise quadrangular turrets. This style of fortification resembles generally similar Chinese structures of the fifteenth century. The second style of wall is a somewhat lower and narrower affair, built throughout of granite or porphyry, with towers at intervals. It is evidently of older date than the first-mentioned wall. Several extensive sections of the wall consist simply of heaped-up stone blocks with occasional watch-towers, while the fourth and most primitive form is that of a clay wall, from 12 to 15 feet high, with quadrangular towers of clay or stone. Speaking generally, the first and second occur to the east, the third in what is called the outer wall, west of Peking, while the clay wall appears to be chiefly confined to Kansu Province and the west of the empire.

From Chinese records it appears that the earliest wall was built by the princes of the Chin dynasty, in the northern part of the Shensi province, and within the great loop of the Yellow River, about the year 300 B.C., the object being to establish and guard the newly acquired marches from the Tartar or Tungus raiders to the north.

The next wall was erected a little further east in the Chan principality, which lay in the northern part of the Shansi province. About 300 B.C. the Dung Hu, a nomad horde who invaded the principality of Yen or, in other words, the plains of Southern Chili, were repulsed for a considerable distance, and a wall erected running parallel with the mountains, and extending north and north-easterly from the province of Chili. A far more extensive wall was constructed after 214 B.C., when the repulse of the Hiungnu led to the building of a frontier rampart, running from Lintau, in Kansu, northward of the Hoang-Ho river and the Gulf of Liau-dung, in the east. There is no reason, however, for supposing that this wall coincided at all with the one at present in existence. It appears altogether to have been a structure of the most primitive character, where a mud mound or wall alternated with mere heaps of stones. Forts or towers were, however, built at intervals, and these were garrisoned without interruption for a few centuries, but they gradually fell into disuse and, after 420 A.D., no further mention of this wall is made. Between the last-mentioned date and the fourteenth century, various frontier walls arose, from time to time, at different points, but it was not till 1368 that the pressure from the Mongols around Peking, and on other exposed parts of the frontier, suggested to the emperors of the Ming dynasty the idea of a continuous and comprehensive wall. And beginning with the early years of their rule, the so-called Great Wall was erected, not all at once, but at detached periods during the ensuing centuries, from the sea, in a great bend round Peking, through Shansi to the Hoang-Ho. The portion lying within the huge loop of the Yellow River may be ascribed to the close of the fifteenth century, and the extreme western section, which consisted of a simple clay wall, and extended from Ning-hia, on the western bank of that river, as far as Shia-yu-kwan, beyond the To-lai river, dates from various periods, between 1530 and 1620.

From all this Von Möllendorff contends that the Great Wall, properly so-called, and erected by the Ming dynasty, was totally unconnected with the older structures, which had been built since remote antiquity, in various sections along the frontier; that no portion of the Great Wall dates more than from four to five hundred years back, and that it was not a uniform construction, but was built piecemeal from the fourteenth to the seventeenth centuries.

Obituary.

Dr. I. I. Hayes.—We regret to have to record the death of Dr. Isaac Israel Hayes, one of our Gold Medallists, who died in New York on December 17th, at the age of forty-nine.—Dr. Hayes was born at Chester, Pennsylvania, and in 1853 obtained the degree of M.D. at the university of his native State. In May in that year, having become much interested in Dr. Kane's plans of Arctic exploration, he joined the second Grinnell expedition as surgeon of the *Advance*, which was fitted out in the United States to search for Sir John Franklin. In the course of that expedition he made his memorable journey towards the centre of Greenland. Returning to the United States in 1855, Dr. Hayes did his utmost to enlist public sympathy in the cause of Arctic discovery, and was at length enabled to obtain the means for fitting out the schooner *United States*, in which he started for Melville Bay in July 1860. He wintered in Foulke Bay, and in the following year reached by sledge a more northern point of Arctic land ($81^{\circ} 35'$) than had been attained by any previous explorer. For this exploit Dr. Hayes received our Patron's Medal in 1867,* and also the medal of the Geographical Society of Paris. In 1869 he accompanied Mr. William Bradford in the *Panther*, of 400 tons, manned by Nova Scotians, on a voyage to Greenland, when photographic sketches were taken of all the principal features on the west coast as far as lat. 76° .—For some years after his return Dr. Hayes turned his attention to politics, and was a member of the New York State Legislature in 1876–80, but latterly he again became known as a public lecturer on various topics, delivering an address on Arctic exploration as lately as December 5th.—Dr. Hayes published several works, relating to various phases of his experiences in the Arctic regions, among which were 'An Arctic Boat Journey in 1854,' issued in 1860 under the editorship of the late Dr. Norton Shaw; 'The Open Polar Sea,' published after his second voyage; and 'The Land of Desolation,' and 'Cast Away in the Cold,' written after his last visit to Greenland, but the latter was a supplement to the narrative of his second expedition.

Major Andrew Cathcart.—The death is announced of Major Andrew Cathcart, than whom few persons had travelled more or met with more adventures. He was born in 1817, and after visiting the West Indies and South America, entered the army in January 1836, as 2nd Lieutenant in the 23rd Foot, exchanging afterwards into the 10th and 11th Hussars. He sold out of the army in 1846, and two years later joined an exploring party which our Gold Medallist, Colonel J. C. Fremont, was then forming in the hope of rendering service to geography during his projected journey across the Rocky Mountains when on his way to settle in California. The expedition attempted to cross the chain in the middle of winter above the headwaters of the Rio del Norte. As is well known, the expedition met with a disastrous termination, for the winter was one of extraordinary severity, and the party were snowed up on the summit of the range, near Spanish Peak, on December 12th, 1848. The mules were frozen to death, as were many of the party; only about half of them escaped alive, and reached Taos, in New Mexico, on February 9th, 1849†. Having somewhat recovered his strength, Major Cathcart returned to England, and in the autumn of 1853 went to Australia for the purpose of visiting the gold-mines. He next made a long cruise in the South Pacific, returning home in the summer of 1855. He was granted in December of that year the local rank of

* See R. G. S. Journal, vol. xxxvii. p. cxii.

† See Mr. W. J. Hamilton's Presidential Address for 1849, R. G. S. Journal, vol. xix. p. lxxxii.

Major while serving in Turkey, and was appointed to the staff of our Associate, Sir W. Fenwick Williams, of Kars. In 1858 he held the post of Chief Superintendent of Police in Mauritius, and in June of the following year was appointed Her Majesty's Consul in Albania, which post he resigned in April 1861. Major Cathcart, who died on January 11th, was elected a Fellow in 1873, and retired from the Society at the end of last year.

Mr. Decimus Burton, F.R.S.—We regret to have to record the death of Mr. Decimus Burton, F.R.S., F.S.A., one of the oldest of our Fellows. Mr. Burton was an architect by profession, and received his early training under his father, Mr. James Burton, and the late Mr. G. Maddox. Among Mr. Burton's principal works were the Zoological Society's Gardens, the Athenæum Club-house, Kew Gardens, and various private mansions. Mr. Burton, who joined the Society in 1833, died on December 14th, 1881, at St. Leonard's-on-Sea, at the age of eighty-one.

REPORT OF THE EVENING MEETINGS, SESSION 1881-2.

Fourth Meeting, 16th January, 1882.—The Right Hon. Lord ABERDARE, President, in the Chair.

PRESENTATIONS.—Colonel A. Crookshank; Dr. John Greenfield.

ELECTIONS.—Thomas Allen Clark, Esq.; H. Grattan Guinness, Esq.; John Wood Jervis, Esq.; Rev. John Jones; Campbell MacGill, Esq.; Rev. W. Salter Price; Herbert Melvill Richards, Esq.; William Shore Smith, Esq.; Ellis Walley, Esq.; Thomas Alfred Ward, Esq.

The following papers were read:—

1. Notes on the Basin of the Rovuma, East Africa. By Joseph Thomson.
2. Makua Land, between the rivers Rovuma and Luli. By Rev. Chauncy Maples.

Vide ante, papers and discussion, p. 65 *et seq.*

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—Second Annual General Meeting, December 16th, 1881: M. FERDINAND DE LESSEPS, President, in the Chair.—In addressing the Society, M. de Lesseps reminded them that this was the first time he had occupied the Chair at a General Meeting since the death of Admiral Baron de la Roncière-le Noury. He paid a just tribute to the memory of his predecessor, dwelling particularly on the assistance he had afforded towards the realisation of the project for the canalisation of the Isthmus of Panama. Among his subsequent remarks M. de Lesseps expressed a hope that in fifteen months' time it would be possible to cut the canal from the Atlantic side as far as the fifteenth kilomètre (9·321 English miles), and he invited those members of the Society who could spare time for the journey, to join him about February 1883, at the first inauguration, and in an inspection of the line of works between the two oceans.—M. Maunoir, the General Secretary, next read his Annual Report on the work of the Society and the progress of Geography in 1881. This Report, which was of considerable length, and occupied the greater part of the sitting, will, as in previous years, be published textually in the *Bulletin*. Among the changes which are to be made

in this periodical at the beginning of 1882, M. Maunoir stated that in future it would be published quarterly instead of monthly, and that to make up for this change, a *Compte Rendu des Séances* would be issued eight or ten days after each meeting. Under the head of Obituary, M. Maunoir referred more particularly to the deaths of MM. de la Roncière-le Noury, Delesse, Cortambert, Fleuriot de Langle, A. Joanne, and Colonel Flatters. He next passed in review the cartographical work carried out by the public offices in France, the Ministries of War, Marine, Public Works, and the Interior. Allusion was also made to the investigations in submarine hydrography by the expedition in the *Travailleur*, under Captain Richard. A scientific commission, at the head of which was M. Alphonse Milne-Edwards, of the Institute, was on board this vessel. The seas off the coasts of Provence and Corsica were carefully explored to a depth of over 8700 feet, and after dredging between Spain and the Balearic Islands, the *Travailleur* put into Tangier, which was the point of departure for the second part of the voyage in the Atlantic Ocean. The numerous soundings and dredgings off the coast of Portugal produced some remarkable results, as they revealed the presence, at a depth of from 4900 to 5900 feet, of large fishes of the shark family, which exist there in large numbers without ever coming to the surface. In returning to Rochefort, the greatest depth which has ever been found in the seas of Europe, was obtained by the dredge in $44^{\circ} 48' 30''$ N. lat., $7^{\circ} 0' 30''$ long. W. of Paris ($4^{\circ} 40' 15''$ W. of Greenwich), viz. 16,733 feet. A great number of foraminifera and radiolaria, several crustacea and an annelid were found in the mud here brought up by the dredge. As regards the Mediterranean, the *Travailleur* expedition has proved that this sea has no fauna of its own, this want being supplied by immigration from the Atlantic Ocean. The remainder of M. Maunoir's address was devoted to the various journeys of exploration undertaken throughout the whole world in 1881.—M. Charles Gachet afterwards briefly addressed the Meeting on the subject of the country of the Tekke Turkomans, which he had visited in following General Skobelev's expedition against the Akhal Tekke oasis in the latter part of 1880.

—January 6th, 1882: M. DAUBRÉE, of the Institute, Vice-President, in the Chair.—Some correspondence was read which had passed between M. Ledoulx, French Consul at Zanzibar, and Mr. Joseph Thomson on the subject of statements made by the latter in his book entitled 'To the Central African Lakes and Back,' relative to certain property of the Abbé Debaize which he purchased after his death. In the letter, dated September 28th, 1881, Mr. Thomson writes:—"On learning the unfortunate mistake I had made, I wrote to my publishers who will see that in any future edition the matter may be placed in a proper light."—A letter was read from Colonel Veniukof, informing the Society that Lieutenant Lukianof had reached Sarakhs, on the banks of the Tejend, and that according to his observations the position of this town on the maps ought to be shifted $16\cdot19$ geographical miles to the west of where it has hitherto been placed; that Colonel Prejevalsky is actively engaged on his great work on Tibet and China, the first volume of which will be published in May with a map; and that the first map of the Russo-Turkish frontier in Armenia by General Stebnitzsky is also on the eve of publication.—It was announced that news had been received from the French Scientific Expedition in Central Asia, the letters from MM. A. Capus and G. Bonvalot being dated Bokhara, October 28th, 1881. They state that they had visited a large portion of Turkistan and Bokhara, and give some interesting details respecting their journey to the Chirchik Mountains, which in their upper part are called the Chotkal. These letters will be published in the *Bulletin*. A telegram from Baku, of December 25th, announced the arrival of the party at Krasnovodsk.—A letter was read from Mr. J. M. Schuwer, dated Fadassi, September 10th, 1881,

giving similar information to that published in the January number of the R. G. S. 'Proceedings' (p. 44).—A memoir was next read from M. Rogozinski, an officer of the Imperial Russian Navy, on the subject of his projected exploring expedition to West Central Africa.—It was reported that M. Meliton Gonzales had presented to the Society a copy of his map of the province of Entre Rios in the Argentine Republic, which he had prepared whilst he was Director of the Topographical Department there.—A letter, dated September 29th, 1881, was read from M. Mizon, reporting his departure from the Upper Ogowé to join M. Savorgnan de Brazza on the banks of the Alima, where he has just founded a third French station.—M. Achille Raffray, French Vice-Consul at Massowah, subsequently made a few remarks at the invitation of the Chairman, and promised to address the Society more fully at an early date on his investigation of the Bogos country to the north of the mountains of Abyssinia, as well as on his mission to the king of the latter country. In the course of this official expedition he visited the Lébul Mountains and the Raya Gallas, previously quite unknown.—Lieutenant R. Roy informed the Meeting that the Danish expedition to Greenland under Lieutenant Holm had fixed the true position of Cape Farewell to be $43^{\circ} 53'$ W. long., $59^{\circ} 45'$ N. lat., and had completed a map of part of the east coast.—M. Ch. Rabot afterwards made some remarks, based on the reports of masters of Norwegian vessels, respecting the abnormal condition of the ice in the Arctic Ocean during the summer of 1881.—The following papers, which will appear in the *Bulletin*, were afterwards read:—(1) Observations on the climate of the centre of the province of Minas Geraes, Brazil, by M. H. Gorceix, Director of the Ouro Preto School of Mines; and (2) On his journey in Somâli-land, by M. Georges Révoil.

—January 20th, 1882: M. HENRI DUVEYRIER, President of the Central Commission, in the Chair.—It was announced that M. Henri Duveyrier had been elected President of the Central Commission for the year, MM. Victor Guérin and W. Huber Vice-Presidents, M. Charles Maunoir General Secretary, and Professor Paquier and M. J. Girard Assistant Secretaries.—The Chairman expressed his thanks for the honour conferred upon him, and referred in complimentary terms to his predecessor, Colonel F. Perrier, of the Institute, who has just been appointed Director of the newly constituted "Service Géographique de l'Armée" in the Ministry of War. After alluding to the change in the mode of publishing the Society's *Bulletin*, he concluded by giving some details as to the scientific results of Dr. Bayol's journey to Futa Jallon, from which it appears that he has surveyed, by compass bearings, a line of about 800 miles, of which the greater part is through an entirely new country, some 220 miles of the region traversed being of an auriferous character.—It was announced that the Minister of War had forwarded to the Society the first four sheets of the large map of Africa (scale 1:2,000,000) prepared by Captain Delannoy, which will be completed in sixty sheets; those now sent contain Cape Colony, Kaffraria, the Diamond Fields, &c.—The return was reported of the party under Senhor Paiva de Andrada, which had been sent out to examine the Lower Zambesi valley from a mineralogical point of view.—Letters, dated in October and November of last year, were read from M. E. Cotteau, who has been visiting China and Japan, and contemplates going to Java and then to Siam. In one of these letters, written from Peking, M. Cotteau complains of the difficulty travellers experience in seeing anything owing to the ill-will of the Chinese. He has since visited Tonquin, and praises the excellence of its climate and the fertility of its soil.—Some news was given of M. Désiré Charnay's further archaeological explorations in Yucatan, the little-known population of which has also been the object of his ethnographical studies.—Colonel Veniukof had undertaken to read a paper on the unexplored portions of Asia, but being unable to attend the meeting,

he sent a letter giving some geographical news which had just reached him. He referred first to the map of the new Russo-Chinese frontier in the Kuldja district, on which are given the thirty-three positions determined astronomically by M. Schwartz in 1879-80. Secondly, with regard to Dr. Regel's journey in Karategin and Darwaz, he stated that the traveller had followed the valley of the Amu-daria as far as the mouth of the Wanj, which the natives consider one of the principal sources of the river, the other being the Panj. The observations he has made are full of interest, as Darwaz, as well as Shignan, have not before been visited by Europeans. The third point in Colonel Veniukof's letter referred to the work of the expedition charged with the investigations respecting the ancient (Uzboi) bed of the Amu-daria, the result of the levellings made being to show that there would be no serious difficulty to the re-establishment of water-communication with the Caspian.—M. Joseph Martin, who has on view in the Society's rooms an exhibition of photographs, maps, utensils, and mineralogical specimens, collected by him in the Amur region and in the Island of Saghalien during a journey which he made on behalf of some Russian companies in order to visit the mines of Siberia, offered some observations on his collections, &c. In the course of his travels M. Martin visited the Transbaikalian region and some parts of Mongolia, and followed the Chinese frontier from Kiachta to Vladivostock, as well as part of the coast-line of the Sea of Japan.—Lastly, M. Charles Rabot, a member of the French Alpine Club, read a paper on his journey in Lapland in 1881, in the course of which he visited the neighbourhood of Rösö, the largest lake in the north of Norway, Svartisen, an immense glacier previously unknown, Sarjektjækkko (7000 feet), the loftiest peak in Lapland, and last of all Jökulfjeld, the only glacier in continental Europe extending down to the sea. The paper will be published in the Society's *Bulletin*.

Geographical Society of Berlin.—October 8th, 1881: Dr. NACHTIGAL, President, in the Chair.—In opening the business of the meeting, the President alluded to the severe loss which geography had sustained in the death of Captain Popelin, the leader of the second Belgian expedition to Central Africa, and in that of Dr. Matteucci, the Italian traveller, who had accomplished the feat of traversing the continent of Africa from the Red Sea to the Gulf of Guinea. With regard to the latter traveller, he (the President) took the opportunity to correct a serious mistake he had made in one of his letters home. Dr. Matteucci had said that he (Dr. Nachtigal) travelled in the Soudan as a Turkish merchant, and that he had abandoned his Italian servant, Giuseppe Valpreda, at Bornu, who in consequence was obliged to embrace Mahomedanism. Both these statements were inexact; he (Dr. Nachtigal) had passed always as a scientific explorer and a Christian, as was clearly shown by the letter of recommendation written on his behalf by the Sultan of Bornu to the Kings of Baghirmi and Wadai, and it was the Italian servant who left him, the man having talked of embracing Mahomedanism early in the journey, at Fezzan.—Letters were then read from members of the German East African Expedition, dated from Kakoma, July 30th, 1881. They reported that an excursion had been made from Kakoma, the German Station, to the Ugalla river, in the district of the same name. The river was found to consist of a series of long and deep pools which were connected together only during, and some time after, the rainy seasons. The breadth of the pools varied much, and in the wider parts the river in the rainy season had the appearance of a magnificent stream. Close to the banks great numbers of hillocks constructed by white ants are crowded together, covered with the richest tropical vegetation. The road across the Ugalla had lately become the safest for Europeans travelling to Tanganyika, as the route by Kissinde, 15 miles further south, is harassed by Njungu, the Ruga Ruga chieftain. But the Arabs avoid the northern road, on account of the son of a Wagalla chief having been killed

by one of their caravans. The high esteem in which the members of the expedition are held in Uganda, was shown by recent events. In the commencement the Sultan, Mlimangomba, had not permitted them to settle at his chief village Simbile. He was then suffering much from dropsy, and several times was given up for dead, with result that the country was threatened with war, a successor not being selected to fill his place. But as it was alike for the interest of the Arabs as well as the natives that peace should be maintained, messengers arrived from all parts to ascertain the position of affairs, and to urge the German Expedition, as a power in the land, to interest themselves in the political condition of the country. The result was that when the Sultan at length died, and his sister Discha was nominated his successor, friendly relations were established, and the new chief requested that one member of the expedition should establish his permanent residence in Gonda, her capital. She ordered two large tembes to be constructed there, and the German flag to be hoisted over them. According to a letter of the 11th of September, a treaty had been concluded between the Sultana and the German Expedition, after the latter had made her a present of gunpowder, according to which they were to aid her with their advice and by acts, and she was to undertake nothing without the consent of the Germans, the latter having their seat in Council by the side of the Sultana, and power over life and death, peace and war. The natives are to render service to the expedition whenever required. These favourable stipulations would occasion the removal of the German Station from Kakoma to Gonda. All stores required by the expedition would be transported free of cost to Gonda, where a piece of ground 80 yards square was given them for the erection of a house to be built by the slaves of the Sultana; who, further, ceded to them sufficient fertile land for their support and that of their servants. The Astronomer of the expedition, Dr. E. Küger, sent a report of his meteorological observations and a set of route-maps. The latter give widely different results from those of Stanley; for example, Simbaweni and the neighbouring places lie about 20' (6° 49' 2") further south than Stanley has fixed them.—Letters from E. R. Flegel, who is travelling on the Niger with the support of the German African Society, down to the 10th of August, were read. After exploring the middle course of the Niger and visiting the ruler of the Hausa States at Sokoto, and the Prince of Gandu, he had returned to Lagos, in order to receive a fresh supply of money and stores, which unfortunately had not arrived; but whilst waiting for the same he was making preparations for his journey to Adamawa. He had made rich collections, especially of ethnographical objects, and had also gathered much information concerning the trade of these countries. It is hoped in the meantime that the fresh supply of funds sent out will enable him to carry out his project of visiting Adamawa, a country at present almost unknown, and affording a favourable starting point for the exploration of a wide tract of Equatorial Africa at present remaining a blank on our maps.

— November 5th, 1881: Dr. NACHTIGAL, President, in the Chair.—The first business of the Meeting was the election of officers for the ensuing year. On the proposition of the Chairman, Professor Bastian was unanimously elected President, and Dr. Nachtigal and Mr. von Schleinitz were appointed respectively first and second Vice-Presidents, while Drs. von Boguslawski, Marthe, and Reichenow were re-elected Secretaries.—The Chairman then communicated a summary of the news from the African travellers, sent out by the German African Society. Dr. Stecker—from whom letters had been received down to August 9th—after the departure of Dr. Gerhard Rohlfs from Abyssinia (29th March, 1881), received permission from the Negus to visit Lake Tana and the neighbourhood, and was also promised that later on he would be assisted in penetrating southwards into the Galla

country. He spent the months of April, May, and June in thoroughly exploring Lake Tana, the southern and western shores of which were previously hardly known at all. This completed, he was ordered by the Negus back to Debra Tabor, and thence went to Lake Ashangi. In his journey to Lake Tana, he passed by Wansage on the Gamara river, where there are hot springs, in great repute among the Abyssinians for bathing. Men and women remain in the water for seven hours at a time, and the efficacy of the baths in the cure of certain diseases is strongly believed in. Wansage is the only place in Abyssinia where native hotels exist. He stayed fourteen days in Korata, during which time he visited many islands in the lake, and ascended Mount Guguwie, which he found by barometrical measurement to be 7183 feet high. He determined the position of Korata as in $11^{\circ} 44' 22.5''$ N. lat., and $37^{\circ} 28' 7.5''$ E. long. (Greenwich). He made an excursion southward from Korata on the 13th of April, towards the point where the Blue Nile issues from the lake. Where it first appears as an independent stream opposite the island Debra Mariam, he found its width to be 110 yards. He stayed a short time at Woreb, about five miles from the exit of the river, where there are imposing cataracts and where the neighbourhood offers a fine field for the explorations of the naturalist. From Woreb, he went, on the 21st April, via Sara to the mouth of the Reb, and to the Lampa district, celebrated for its magnificent trees and the most beautiful place on the shores of the Tana. He thence proceeded to Gondar. On Mount Goraf (7000 feet), which he ascended from Gondar, he found conspicuous traces of a large lava stream, which sloped to the shores of the lake. His report, with an excellent map, will be published shortly in the 'Mittheilungen' of the German African Society. During the winter Dr. Stecker hoped to visit the unexplored country west of Lake Tana, and afterwards to be able to reach Kaffa, in accordance with a written promise which he had already obtained from the Negus. With respect to his ulterior movements, it is uncertain whether he will return to Abyssinia, or make an attempt to reach the Juba river. Dr. Stecker reports that Lake Tana has a superficial area of 1150 square miles, and is at an elevation of 6370 feet above sea-level; its greatest depth is between the island Dega and the peninsula Zega, viz. 38 fathoms. He took 300 soundings, but believes greater depths exist north of Dega Island. He has made various collections there, determined the latitude of twelve positions, &c.—In East Central Africa Messrs. Böhme, Kayser, and Reichardt were reported to be at the Kakoma station in Uganda, but they have established such an excellent understanding with the natives, that they would probably remove their station to Gonda, the capital. A description of the neighbourhood of Kakoma had been received, and it was expected that a series of astronomical observations for the position of various localities would shortly come to hand.—A paper was next read by Dr. Credner on the fresh-water lakes in which fossil remains of marine fauna are found; and the Chairman afterwards read his report on the third International Geographical Congress at Venice.

— December 3rd, 1881: Dr. NACHTIGAL, President, in the Chair.—After the preliminary business the President gave the Meeting an account of the progress of the expedition of Messrs. Pöge and Wissman, sent out to the Congo region by the German African Society. Letters had been received dated Kimbundo, July 30th, and Mieketto, August 11th, the latter place eight days' journey N.N.E. of Kimbundo. The travellers reported that they had been obliged for the present to abandon their intention of reaching Mussumba, the residence of the Muata Yanvo, not so much because Dr. Buchner during his long stay there had not been able to satisfy himself that this powerful monarch would grant permission to a European to travel to the north or east of his dominions, but because the Muata Yanvo was now at war with the Kioko tribe and the road was closed. They had therefore decided

to direct their course to the chief Mukende in Tushilango-land, regarding whom they had received favourable reports. The road thither for about thirty-six days' march lay along the left bank of the Chikassa river as far as the Kassai, and after crossing the latter, for about fourteen days' march further to the junction of the Lulua with the Kassai. About five days' march to the eastward of Mukenge, the residence of a chief situated near the junction, they expect to come upon the great lake of which the traveller Schütt obtained some information. The Tushilango tribe have an excellent reputation for peaceableness and hospitality, and the only obstacle Dr. Pöge fears is the opposition of Kalangulo, a chief of the Kalunda, who is subject to the Muata Yanvo; but as his residence is away from the road he hopes by forced marches to pass beyond it without molestation. The German African Society had received this news of Dr. Pöge's plans with great satisfaction, the route he contemplated being of far greater geographical interest than would have been a third visit to the Muata Yanvo, whose good-will could no longer be relied on. Mukenge lies several hundred miles to the north of Schütt's furthest point, and Messrs. Pöge and Wissman would be there in an entirely unexplored part of the Congo basin, near the 5th degree of south latitude, and probably find no difficulty in reaching the rumoured large lake and travelling thence to the main stream of the Congo. Lieutenant Wissman, in a letter accompanying the present Report, announced the despatch of his route-survey maps.—The President then alluded to the Arctic voyage of the American ship *Rodgers*, which, although unsuccessful in its main object of finding the lost *Jeannette*, had accomplished useful work in surveying Wrangell Land. He also referred to the news just arrived from Australia regarding the long-reported discovery of the journals of Leichhardt and Classen; the finder, Skuthorpe, long disbelieved, having at length produced the documents.—The following papers were read:—1. On his observations during the Schwatka Expedition in search of remains of the Franklin Expedition, by M. Klutschak. 2. On Glacier Phenomena in the Harz, by Professor Kayser.

Imperial Geographical Society of St. Petersburg.—November 16th, 1881: M. P. P. SEMENOV, Vice-President, in the Chair.—In a report which was furnished to the Meeting by the Secretary, an account was given of the progress of two expeditions which had been despatched by the Society—M. Malakhof's * to the Ural and M. Regel's to Central Asia. The anthropological investigations of M. Malakhof, which were brought to a conclusion in October last, had for their principal object the examination of the caves of prehistoric man, discovered by him in 1880, and the search for traces of primitive cultivation in the Southern Ural, a region previously unexplored from this point of view. In the course of his journey M. Malakhof examined the districts of Urjum and Yelabuga, in the Government of Viatka, a large portion of that of Perm, and the Troitsk district in Orenburg. In the first-named district he discovered near the village of Verobieva prehistoric remains, including a number of objects in metal and bone, as well as fragments of clay vases. The bones found were those of the deer, bear, wild boar, beaver, horse, &c. In the Governments of Perm and Orenburg M. Malakhof explored a number of caverns without success, but he was more fortunate in his explorations on the shores of the Aiatsky, Shiguirchi, and Yurinsky lakes, and on the rivers Isseta and Miass, where he made a large collection of arms of polished silix, and of objects in bone, clay, bronze, and iron. The materials collected by M. Malakhof lead to the conclusion that in the Ural region the passage from the stone to the metal age took place in a wholly independent manner owing to the abundance of the metals. In one tumulus he found the skeleton of a man with

* See vol. iii. p. 490.

heavy copper ornaments on it; and in the course of other excavations he met with a considerable quantity of bronze idols, amulets, and articles made of gold. In addition, M. Malakhof has collected interesting materials bearing on the customs of the Permiaks and the Cheremisses now living in the Government of Viatka; he witnessed their pagan ceremonies and their sacrifices to their idols, and he has brought back with him numerous photographs of types of these tribes. M. Malakhof has, further, taken copies of the red hieroglyphic inscriptions found on the rocks along the rivers Vijera, Taghil, and Reja.—According to the letters which have been received from him, Dr. Regel has already pushed his explorations much further than might have been expected. He set out from Samarkand early in August, and ascended the river Zarafshan, reaching its sources on August 27th. Crossing the Pakshif defile, he penetrated into Karategin and visited the capital. He next went to Darwaz, and on September 26th he arrived at Kila-Khumb, on the river Piandj. He hoped to push still further on, and to winter in Shignan.—The Secretary afterwards read a communication on the recent discovery that Wrangell Land is an island and not part of a polar continent, as had been supposed.—Professor Grigorief afterwards read a report on the Russian section in the late Geographical Exhibition at Venice, which, he stated, ranked highest in the scientific importance of the exhibits.

— December 14th, 1881: M. P. SEMENOF, Vice-President, in the Chair.—The Secretary gave an account of M. Poliakov's expedition to the Island of Sakhalin (Saghalien) and of M. Adrianof's to the district of Kuznetak in Western Siberia.*—M. Poliakov landed at Duet, in Saghalien, on June 26th, from the steamer *Nijni-Novgorod*, but being unable to obtain quarters at the post there, he went by boat to the mouth of the Duika, or Alexandrofka, to the penitentiary of Alexandrof. He there met two old fellow-travellers,—Captain Illashinsky, with whom he had undertaken the Olekminsk expedition in 1866, and Dr. Suprunenko, in whose company in 1875 he had explored Russian Karelia and the Provenets country,—both of whom have rendered him much assistance. M. Poliakov commenced his studies in the valley of the Alexandrofka, where he remained from June 26th to August 4th, going then to the east coast, and to the mouths of the river Tim, where he proposed to spend three or four months. In his exploration of the Alexandrofka valley M. Poliakov set himself to study, first the present condition of agriculture, and secondly the physical conditions on which the development of the country depends:—viz. the soil, vegetation, fauna, and climate. The meteorological observations of Dr. Suprunenko furnished him with valuable data regarding the climate, and M. Poliakov has communicated the results of some of these, as well as of his own observations. In June the mean temperature was $52^{\circ}\cdot88^{\circ}\text{F.}$, the maximum not exceeding $63^{\circ}\cdot86^{\circ}\text{F.}$; and during the whole of this month there was not a single day on which the sky was entirely clear, sixteen days being cloudy and eight foggy. An examination of the soil of the Duika valley proved its marshy origin; at a great number of places the upper layer was formed of peat to the depth of nearly $2\frac{1}{2}$ feet, resting on a deep peat bog. The elevation of the valley is only six or seven feet above sea-level, and consequently the fall of the river is so small that during high tides the sea flows up several miles above the mouth, and floods the low-lying parts of the valley. In the more elevated localities where the colonies are established, the soil consists of marl, often mixed with peat and sand; the land there is partially cultivated, but without manure only yields insignificant crops. Such is the character of the Great Alexandrofka valley, and that of the Little Alexandrofka is almost the same, excepting that in some parts the conditions are more favourable. The convicts grow cabbages, potatoes, and rye; but the area of land suitable for cultivation

* See vol. iii. p. 490.

is limited, and clearing difficult. M. Poliakov has made a limited collection of birds and small animals, and he reports that the ornithological fauna of the Alexandrofska valley presents striking analogies with those of Siberia and Northern Russia, and that the river fauna offers striking proofs of the geographical connection between the island and the extreme north of Siberia. Fresh-water as well as sea fish are very abundant, and M. Poliakov is of opinion that they would furnish the inhabitants with a large supply of food in winter.—Numerous traces attest the existence of man in the island in prehistoric times. In nearly all the localities where colonies are established, implements of stone and flint have been found, which in their type are similar to, or identical with those collected in European Russia. Among those of flint many appear to be of foreign origin, for no outcrop of rocks of a like kind has yet been met with in the island. Some utensils of obsidian prove the relations which the inhabitants must have had in prehistoric times with those of Kamchatka or the islands of the Pacific; and fragments of clay vases are found in abundance similar to those met with in Russia. M. Poliakov has discovered the remains of human dwellings contemporaneous with the age of stone. These are round cavities dug in the earth which are analogous to the habitations of the Kamchadales.—During the meeting the Society received, through the courtesy of the Governor-General of Eastern Siberia, further information respecting the labours of M. Poliakov in regard to the exploration of the Tim. The mouth of the river offers a good anchorage for vessels of moderate tonnage; those drawing 16 feet of water can ascend the river for more than three miles, if not stopped by the barrier erected in the stream during summer by the Japanese fishermen. Fisheries might be organised here which would furnish an enormous supply of fish, seals, and whales. The length of the river Tim to the colony of Derbinsky is 246 miles; for a distance of nearly 50 miles along the shore of the Sea of Okhotsk the river flows through a low and marshy country, which is not suited for agriculture, and is accessible to boats drawing seventeen inches of water; along the rest of its course, some 200 miles further, where eleven rapids are met with, the valley is bounded by the wooded spurs of the Saghalien and Tim ranges. This valley, which varies in width from two-thirds of a mile to rather more than three miles, is marshy, and covered with bushes and poplars. Cultivation can only be carried on on a small scale, and that not within 80 miles of Derbinsky. M. Poliakov took seven days (57½ hours' actual travelling) to descend the Tim from Derbinsky to its mouth, and nine days (75½ hours) to return to the colony. The entrance to the Nabil, some 13 miles south of the Tim, also affords good anchorage for vessels of moderate size, but the Nabil itself is shallow, and forms a delta. M. Poliakov has made a topographical survey of all the localities he has traversed, and the general results of his labours are very important. The mouth of the Tim is the only natural port met with along the whole of the rocky coast-line of the island, with the exception of the Bay of Kuegda which is situated in the northern part in a barren and inaccessible country. In establishing the fact that the mouth of the river is accessible to vessels of a certain tonnage, and that the Tim itself is navigable in the lower part of its course, M. Poliakov has settled a question of importance in regard to the provisioning of the colonies in the Duet district.—In regard to M. Adrianof's expedition in the Kuznetsk region, the Secretary communicated the following particulars:—Starting from Kabizan on July 28th, M. Adrianof traversed Lake Telets, and ascended the river Chulyshmann (the valley of which is thickly inhabited) as far as the confluence of the Bashkaus. He then ascended the valley of the latter, following an almost impracticable path, and as he advanced, progress became more and more difficult. Temperature rapidly decreased, and in crossing a pass, whence the view extended far away over the mountains of North-Western Mongolia, the thermometer fell to 35°·6 F. On August 15th M. Adrianof crossed

the Shapahal chain, which forms the northern prolongation of the Tannu-Ola Mountains, and the northern slopes of the chain were then thickly covered with snow. Thence M. Adrianof reached the banks of the Jani-Shu, an affluent of the Bailyk, and re-entered an inhabited region; the Sopotes had pitched their tents there, wherever some pasturage was to be found. After having traversed another mountain chain, M. Adrianof entered the vast Kemchik Steppe, which throughout its whole length is covered with fields of millet and barley. After a few days' rest he travelled to Minnussinsk in company with M. Safianof, without encountering any difficulty. M. Adrianof, who has collected interesting information respecting the Sopotes and Russian commerce in this part of Mongolia, calls attention to the difficult circumstances in which Russian merchants are placed, and the vexatious treatment they have to undergo at the hands of the Chinese. During the whole of his journey he made meteorological observations, and he brings back with him collections in various branches of science.

Geographical Society of Rome.—November 27th, 1881: PRINCE DI TEANO, President, in the Chair.—This being the opening meeting of the Session, there was a considerable attendance of members and their friends. A number of paintings in oil and water-colours, by Commander G. Haimann, of scenes in Tripoli, were exhibited, together with collections in various branches of science, the results of his journey in that region. The routes of Captain Camperio and Commander Haimann in the interior of Tripoli were shown on a large diagram.—The Chairman opened the proceedings by giving a brief sketch of the lives and labours of Messrs. Giuletti and Frigerio, Gessi Pasha, and Dr. Matteucci, whose loss he deplored.—He afterwards read a letter from the Geographical Society of Paris, communicating the votes of thanks which had been passed at their meeting of October 21st, recognising the great services rendered by the Society in connection with the late International Geographical Congress at Venice.—Commander Haimann then addressed the Meeting on the subject of the journey which he had undertaken in Tripoli in 1881 in company with Captain M. Camperio. He commenced by stating that the expedition was due partly to the advice of Dr. Gerhard Rohlfs and Dr. Schweinfurth, and partly to the enterprising spirit of the Milanese Society for African exploration. After briefly noticing the important light in which from ancient times the Greeks and the Romans had always regarded Cyrenaica, and the various vicissitudes through which the country had passed down to the present day, Commander Haimann proceeded to give an account of his journey. He narrated in some detail the various difficulties which he had encountered and surmounted, the knowledge which he had acquired, and the peculiarities which he had observed, illustrating his remarks by frequent reference to the diagram and pictures exhibited. The time occupied by this narrative necessitated the postponement to another meeting of a series of observations of a scientific nature on the localities traversed and the collections made, as well as on the agricultural and commercial importance of this region of Africa.

— December 18th, 1881: PRINCE DI TEANO, President, in the Chair.—Lieutenant Alfonso Maria Massari, of the Italian Navy, read a paper on his journey across Africa in 1880–1, in company with the late Dr. Pellegrino Matteucci. He commenced by explaining the origin of the expedition, the first idea of which was due to Prince Giovanni Borghese, who bore nearly the whole of the expense incurred, and accompanied the party himself during the earlier part of the journey. Lieutenant Massari joined Dr. Matteucci and the Princes Giovanni and Camillo Borghese at Cairo, where he received the outfit of scientific instruments sent by the Society. The party travelled by way of Suakin and Karosko to Khartum, where Prince Camillo Borghese left them and returned home.

Having organised their caravan, they directed their course westwards, by El Oboid, capital of Kordofan, to El Fasher, capital of Darfur, in which province they found that water, already scarce, is year by year becoming scarcer, so that fears are entertained of the country eventually becoming a desert. On reaching the limits of Egyptian territory, the expedition met with extreme difficulty in obtaining permission from the Sultan of Wadai to enter his kingdom, and indeed, at one time they almost despaired of ever obtaining it. It was then that Prince Giovanni Borghese determined to return home by way of the Nile, taking with him the records of the first part of the journey. Being left alone, Dr. Matteucci and Lieutenant Massari, by patience and prudence, at length got permission to enter Wadai, and were received at Abeshir, the capital, by the suspicious Sultan. Through the fear of the Egyptians, all roads to the east have been closed, and commercial intercourse is held, on the north, with Bengazi by way of Kufra, and, on the west, with the kingdoms of Bornu, Baghirmi, &c. At first the travellers were viewed with much suspicion, which, however, gradually disappeared, and the Sultan treated them with a certain amount of affability, and loaded them with presents, giving them also letters of recommendation to the Sultans of the neighbouring countries. The expedition subsequently traversed Baghirmi, Bornu, and Kano, in Sokoto, in all of which kingdoms they were well received. From Nupé they wished to have gone by land to the Atlantic coast by way of Illori, but the wars which have raged in the country for years past, compelled them to alter their plans, and descend the Niger to its mouth.—At the conclusion of the paper, the Chairman, after some reference to the importance of the journey, announced that two gold medals had been voted by the Society, one to the memory of the lamented Dr. Matteucci, and the other to Lieutenant Massari, and that Prince Giovanni Borghese had been elected an Honorary Member, in recognition of his services in connection with the expedition.

Geographical Society of Cairo.—November 25th, 1881: General STONE-PASHA, President, in the Chair.—M. Abbate read a report on the part taken by Egypt in the International Geographical Congress at Venice, and the General Secretary a report on the Exhibition, and the part taken in it by Egypt, to which seven first-class prizes and one honourable mention were awarded.

—December 16th, 1881: General STONE-PASHA, President, in the Chair.—The sitting was devoted to reading obituary notices. The General Secretary dealt with that of Mgr. Comboni, Vicar Apostolic of Nigritia, who died at Khartum on October 9th, and in connection therewith gave an historical sketch of Christian missions in Africa.—The Chairman addressed the Meeting on the life and services of Purdy-Pasha, an American officer, who had held the rank of General in the Egyptian service, and who died during the spring of 1881. General Purdy-Pasha, he observed, would always be remembered by his map of Darfur, and his detailed report on the military-geographical expeditions which he undertook for the Egyptian Government.

Geographical Society of Lyons.—November 3rd, 1881: M. LOUIS DESGRANDS, President, in the Chair.—This being the first monthly meeting of the current session, the Chairman made some remarks on the results of the late Congress of French Geographical Societies held at Lyons, and on the success of the exhibition, the number of visitors to which was largely in excess of what had been expected. In distributing the rewards on this occasion, the jury had set the highest value on the Diploma of Honour, on the same principle as was afterwards followed at Venice. An understanding was further arrived at for the establishment of an important prize to be awarded periodically in the name of all the Geographical Societies of France. It was announced that the Publication

Committee was actively preparing the report of the proceedings of the Congress, and that another committee was about to take into consideration a proposition for founding "Geographical Groups" under a new form, and also to endeavour to find other premises for the Society, more befitting its present importance and development.—Notice was given that the course of historical and military geography, as well as that of physical and commercial geography, would recommence at the usual time.—A letter, dated Yokohama, August 26th, was read from M. Michel, a member of the Society, furnishing some interesting information on the subject of economic progress in Japan, and the disposition of Japanese merchants towards Europeans.—The General Secretary afterwards gave a sketch of recent geographical work. The most important fact alluded to was the journey across Africa of Dr. Matteucci and Lieutenant Massari, and a report was given of the address delivered by the latter at the Venice Congress, in which it would have been more acceptable to have had more detailed particulars regarding the orography and hydrography of the countries traversed by the expedition.—Reference was next made to the departure of the Upper Niger Topographical Mission and Dr. Bayol's journey to Timbo, in the Futa Jallon highlands, and also to Mr. Stanley's and M. de Brazza's work in West Africa, and Lieutenant Delaporte's scientific expedition to the Indo-Chinese Peninsula.—The General Secretary made some remarks on the great loss experienced by the Society in the premature death of M. Henri Bionne, and on the motion of the Chairman a vote of condolence with his mother was unanimously passed.—It was announced that two new geographical societies had been formed in France, the one at Dijon and the other at Bourg.—M. Ganeval then read a report on the proceedings at the International Congress at Venice, dealing successively with its organisation, principal labours, and the part taken in it by the Society, especially in contributing to the rejection of a resolution which had a tendency to separate commercial from scientific geography. He also spoke of the splendid fêtes given by the City of Venice, which had voted the sum of 6000*l.* for the worthy reception of its guests.

—December 28th, 1881: General Meeting.—M. LOUIS DESGRANDS, President, delivered his annual address, the first part of which dealt with the International Geographical Congress at Venice, and the fourth provincial Congress of French Geographical Societies held at Lyons last September. With regard to a proposition made by his Society at the latter for the establishment of a prize to be periodically awarded in the name of all the Geographical Societies of France, M. Desgrands stated that it had been determined that such a prize should be awarded every four years at a National Congress, and by the Society of the town in which such Congress met, and that each Society should contribute towards it a one-hundredth part of its annual revenue, which would suffice to make the value of the prize at least 200*l.* M. Desgrands afterwards referred to several matters of local interest, and in conclusion he mentioned that during the year seventy new members had joined the Society, which in the same period had lost ten members by death or resignation.

Geographical Society of Marseilles.—November 26th, 1881: M. ALFRED RABAUD, President, in the Chair.—M. Georges Revoil again* addressed the Society on the subject of his recent scientific expedition to Somâli-land. On the present occasion his remarks were divided into two parts, in the first of which he recounted a number of anecdotes regarding his journey and its attendant difficulties, going over to some extent the same ground as before. He exhibited a collection of Somâli types which he had photographed, and which excited considerable interest at the meeting. Generally speaking, the Somâlis are a handsome race, whose skin, varying in colour

* See vol. iii. p. 571.

from black to bronze, with all the intermediate shades, does not lessen the nobility of their features. These indicate their Indo-European origin, and it is evident that they are related to the Abyssinians, and the Danakil and Galla tribes. In the second part of his address M. Revoil put forward his suggestion that a white colony, possibly of Egyptian, Phœnician, Greek, or Roman origin, coming by way of the Ptolemies' canal, had settled at Cape Aromates, and that it was through admixture with this that the features of the aboriginal races had obtained their present cast. According to M. Revoil, the Somâlis of the present day are only Europeans with dark skins; and at any rate he sees in them an evident transition from the negro to the Caucasian type. M. Revoil finds strong arguments in support of his views in the idiom, arms, dress, and manners and customs of the Somâlis.

Society for the Promotion of the Geographical Knowledge of Africa, St. Paulo de Loanda.—December 1st, 1881: Dr. JOSÉ BATTISTA DE OLIVEIRA in the Chair.—The meeting was held for the purpose of welcoming the German traveller Dr. Buchner,* on his return from the interior of Africa. After some remarks by the Chairman expressive of the Society's desire to receive Portuguese and foreign explorers with equal cordiality, Dr. Buchner gave a brief account of his journey to the Mwata Yanvo's capital at Mussumba, where he spent six months, and of the route followed on his way back to the coast. With regard to the hydrographic system of the river Kassai, Dr. Buchner remarked that, during the nine months subsequent to his leaving Mussumba, in his endeavours to push northwards, he had passed the rivers Luiga, Lulua, Kahungula, Kassai, Luembe, Chihumbo, Kikopa, Luvo, Luchiko, Loangue, Kuillo, Kuengo, Koango, Lui, and Kuichi, thirteen of which he crossed in canoes. With the exception of the last two, all these rivers have parallel and northerly courses. In this respect Dr. Buchner fully agrees with the views of his predecessor, Herr Schütt, as to the Kassai water-system, but he does not think that, even after it has received all its tributaries, the Kassai can be in any way compared with the Lualaba. Where he passed it the last time, in 8° S. lat. in the dry season, the Kassai had only a breadth of 394 feet, and a depth of 10 feet, with a current of rather less than two miles. In these respects, therefore, it is inferior to the Kwanza at Dondo, but it is nevertheless the most considerable of the rivers mentioned.

New Geographical Society.—We have been notified of the formation in January of a Geographical Society at Jena, under title of "Geographische Gesellschaft zu Jena." The quarterly *Mittheilungen* of this Society, of which the first number will be published towards the end of March, is intended to form a centre for the results of the geographical and ethnological researches of missionaries of all nationalities.—Dr. E. E. Schmid, Professor of Mineralogy and Geology in the University of Jena, is the first President of the Society, and Dr. D. Schäfer and Dr. Fr. Regel are the Secretaries.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Belle, Henri.—Trois Années en Grèce. Paris (Hachette): 1881, 12mo., pp. 413, map, illustrations. (*Dulau*: price 3s. 6d.)

The author, First Secretary at the French Embassy, records his experiences and impressions during a three years' residence in Greece. Some of the illustrations are of slight geographical interest.

* See vol. iii. pp. 370, 372.

Civiale, A.—*Les Alpes au point de vue de la Géographie physique et de la Géologie. Voyages photographiques dans la Dauphiné, la Savoie, le Nord de l'Italie, la Suisse, et le Tyrol.* Paris (Rothschild): 1882, 8vo., pp. vii. and 619, heliographs, and two maps in separate covers. (*Dulau*: price 2l. 8s. 9d.)

The author has for ten years worked with the camera in the Alps, and his resulting notes on the application of photography to Physical Geography and Geology have appeared in the 'Comptes Rendus' of the French Academy of Sciences for 1860-69. Papers by him on the same subject have also appeared in the publications of various Continental Alpine associations. He here collects his experiences, which (to avoid repetition) are narrated as those of a single journey, commencing at Mont Viso in Dauphiné, traversing Savoy, Piedmont, Switzerland, and Tyrol, and terminating at the Gross Glockner.

The body of the work consists of topographical, physical, and geological details of the country on the various specified routes, and is illustrated by fourteen heliographs (from the author's photographs) which leave nothing to be desired; it is indeed difficult to imagine any delineations of the earth's surface more suitable for purposes of instruction, so far as the Alpine phenomena are concerned.

The easy passes of the Alps are summarised, and an alphabetical table is given of the geographical positions and names (with altitudes) referred to in the book, both of these being also reproduced in more portable form, attached to one of the maps. A catalogue is also given of various specimens of rock obtained in different localities.

The maps (scale 1:600,000) are of the whole Alpine region discussed, taken from the photographic panoramas of the French, Swiss, Italian, and Austrian Staffs, and show the stations of the different panoramas selected, and their horizon boundaries.

Elton, Charles.—*Origins of English History.* London (Bernard Quaritch): 1882, large 8vo., pp. xiv. and 458, maps. Price 16s. 8d.

The author's object has been to collect the best and earliest evidence as to the different peoples with which the English nation in any of its branches is connected by blood and descent; and he here arranges in a convenient form what is known of the history of our country from the obscure ages which preceded the Roman invasions to the time of our acceptance of Christianity.

Very much, especially of the earlier portion, is necessarily occupied with investigation and annotation of the earliest voyages recorded which have any reference to the British Isles; and the author, in Chapters I. and II., attempts to reconstruct the narrative of the travels of Pytheas from Marseilles round the Spanish coast to the south of Britain, his visit to Germany and the Baltic, his famous voyage to Thule, and his return to Marseilles. Then follow discussions on the early Greek geographical romances about Britain, and references to Posidonius, Artemidorus, and the other Greek explorers who followed on the track of Pytheas. The remainder of the book is mostly historical and ethnological; but it contains incidental notices of a topographical nature.

Quotations (in the original languages) are given in the first Appendix in proof of the knowledge of the ancients as to the geography of Northern and Western Europe; and the second Appendix consists of a valuable chronological list of Greek and Latin writers to whom references are made in the work.

There are ten maps:—Spain, the World of the Ancients, Eastern Europe, Gaul, the British Isles, and Germany, from various editions of Ptolemy; Northern Europe from Olaus Magnus; South-Eastern Britain from Peutinger's Tables; and the Isle of Thanet from Dugdale.

Lenormant, François.—*La Grande-Grèce. Paysages et Histoire. Littoral de la Mer Ionienne.* Paris (Lévy): 1881, 2 vols. cr. 8vo., pp. vii., 473, and 466. (*Dulau*: price 12s.)

Although chiefly of historical and archæological interest, these two volumes contain much incidental geography and topography referring to the ancient assemblage of Greek colonies on the shores of Southern Italy, formerly known

as Magna Græcia, Tarentum, Metapontum, Heraclea and Sir's, Sybaris, Thurii, Roscianum, the towns of Philoctetes, the valley of Neæthus, Crotona, Catacium, and Scylacium, and their modern equivalents, with actual and intermediate conditions, are discussed in separate chapters.

Rae, Edward.—The White Sea Peninsula, a Journey in Russian Lapland and Karelia. London (Murray): 1881, cr. 8vo., pp. 347, map in cover, etchings, woodcuts [no Index]. Price 15s.

The author's route was from Vardo to Kola and, after an excursion up the Tûloma to the Nuot Lake, round the Lapland coast to Kusomen on the south, from which point he crossed the White Sea to Solovetsky and Kem, following the Karelian coast northwards and returning to Kola by the Imandra Lake. He also ascended the Ponoï until stopped by ice, and gives some interesting particulars of that little-known river, with a journal kept by an intelligent peasant whom he induced to make the overland passage from Varzuga to Lake Sergozero and thence to the upper waters of the Ponoï, following it to its mouth. The map illustrating all the region traversed is from the October No. of our 'Proceedings' for 1880, with some few additions.

Considerable attention was paid by Mr. Rae to linguistic subjects, and he gives a vocabulary of 20 pages in English, Samoyede, Russian-Lapp, and Russian, with various legends and tales. Some minerals observed are also recorded in the Appendix, which contains a list with localities of flowers seen in Russian Lapland, and of birds observed in the Kola Peninsula and Karelia, and between Enara Lake, the Tûloma, and Mutke Gûba.

ASIA.

Hatton, Joseph.—"The New Ceylon," being a Sketch of British North Borneo, or Sabah. From official and other exclusive sources of information. London (Chapman & Hall, Limited): 1881, cr. 8vo., pp. 209, maps, frontispiece. Price 5s.

Mr. Hatton has here given a sketch of the origin of the (now chartered) British North Borneo Association, and its acquisition of the territory of Sabah in Northern Borneo, of which a preliminary account was supplied by Mr. Alfred Dent, one of the Directors, in his observations on Mr. W. M. Crocker's "Notes on Sarawak and Northern Borneo," published in our 'Proceedings' for 1881 (p. 206). He has also extracted from the works of Brooke, Wallace, St. John, Burbridge, Moor, Bock, and others, such points as appeared to bear on the subject; but the chief interest in his compilation is in his extensive quotations from the reports of Mr. T. S. Dobree, Mr. W. B. Pryer (the Resident of Sandakan), and Mr. F. Wittl, originally printed for private circulation (and for copies of which, with accompanying tracing of Mr. Wittl's map, the Library is indebted to the courtesy of Mr. Alfred Dent).

Mr. Dobree's reports were chiefly on the suitability of the land which he examined in 1878 for planting *Coffea arabica*; on the west coast, he went up the Papar river to the Gallamuttai and Leenai, and prospected the land about Tampussuk and Pandassan, and the valley of the Ginambur; on the east, he visited Sandakan Bay and the country round the harbour, going a short distance up the Kinabatangan and Sea-Galley-Hood rivers. These preliminary operations were from June to September 1878.

Mr. Pryer's Report is the Diary of a trip up the Kinabatangan in February 1881, for 150 miles further than it had ever been ascended by any European. On the afternoon of the eighth day he reached the first of the true villages of the interior, having passed through a depopulated country, unattractive in appearance, being chiefly interminable forest, but presenting unrivalled opportunities for the cultivation of rice, sago, sugar-cane, and other tropical products. Three villages only were seen during 300 miles. Once fairly among the natives of the interior, all this was changed, houses and clearings being seen close together, with rarely more than half a mile between one campong and the next. Imbok, the furthest point, was reached on 4th March; here Mr. Pryer

was well received, and found many plantations, houses, fruit-trees, &c.; the larger mammals were also apparently abundant, though all animal life had been very scarce on the road. The country as a whole was flat, but the horizon to its north was bounded by a bold range apparently over 2000 feet high and 20 miles long.

Mr. Witt's diaries relate to his excursions from Marudu Bay, in the north of the territory, to Papar, round the eastern slopes of Kinabalu, in November and December 1880, and to Sandakan in May and June last. In the first, he corrects some errors in the Admiralty chart referring to the mouth of the Sekuati, and describes an escape of liquid petroleum from the bed of the Kurina, near the common mouth of that river and the Sekuati. Springs of this mineral oil were found at low water, with other indications of a producing area some 80 square yards in extent; and the material is at once available for steam fuel. Striking south down the Bongon river, it was observed that a former visit had had the effect of restoring confidence among the Dusuns (the descendants of the aborigines), so that traffic was materially increased. Mr. Witt incidentally records his belief that no Chinese colonies ever existed in the very north of Borneo, in spite of the generally received opinion to the contrary. From Mumus (where on the former visit Mr. Witt had turned westwards along the Kinorom), new ground was entered upon, the range being crossed that runs from Mount Tambuyokon to the north-east. Here, near Moroli, the country hidden from the west by the mass of Kinabalu was first revealed, the mountain being found to be bordered by a high range to the north-east, in which direction it is itself evidently impracticable, though appearing from the north to be a gentle slope. Continuing south and south-west, on the eastern slopes of the Kinabalu range, and crossing various affluents of the Sugut, Mr. Witt was in the portion of his route between Koligan and Danao compelled to investigate the lake-problem, as his track had practically cut into the hypothetical area hitherto occupied by Lake Kinabalu on our maps. The northern Dusuns had always spoken of an extensive place in the interior round which many villages were scattered, and called Danao, a word signifying nothing to them, though it means "Lake" in Malay (for which the Dusun equivalent is "Linatong"). They, however, denied the existence of any sheet of water on which canoes could be paddled. But on the present journey, after leaving Moroli, Mr. Witt heard of a lake in the mountains between Koligan and Danao, to which evidently much superstitious dread attached, but which, on his being taken to it, proved to be a meadow in an overgrown wood, perhaps becoming a pond sometimes. Some possible vague report of this, and the error as to the Malay word "Danao," are reasonably supposed to have originated the geographical error now set right. Danao itself, taking its name from its central village, is a remarkable plain, 1600 feet above the sea, an oasis in a huge virgin forest, entirely surrounded by mountains; it is watered by the Manzanaban in the north and the Linogu (said to be one of the two main sources of the Kinabatangan) in the south, and is partly converted into a swamp during heavy floods, its whole surface being a rich black mould. On its skirts are six villages, and it supports about 1200 people (formerly head hunters), who grow sago and tapioca besides the usual rice, and also rear goats.

From Kiawawi, south of the Linogu, Mr. Witt's route was more or less westwards. From this point he saw the peak of Mentápok bearing north-east, asserted by the Dusuns to be higher than Kinabalu. Various streams running south and east were crossed, and mountain-ridges (some 3200 feet high), not belonging to the Kinabalu system, but rather grouped round some stock to the south-east of it, evidently the Mentápok.

Many villages were passed, the inhabitants of which cultivate rice, coconut, and betel palms; near Pinowantei, in the Paras district, small bamboo aqueducts were used for irrigation purposes, and buffaloes were reared for food, the plough not being known. At Lampada, a little further west, Kinabalu assumes its most imposing aspect, and Mr. Witt observes that the Dusuns of Pinuruk are reported to ascend it occasionally from their side, on the south-east. A descent from the tangled mountain mass through which the road had led for a week brought the traveller to Tambunan on the southerly flowing Sonsuron, the valley of which was ascended in a north-westerly direction to the 4700 feet

high ridge separating it from the Papar drainage area. The Papar itself, here a mere noisy brooklet, but rapidly widening in a tortuous course and bouldered up so as to form many rapids, cascades, and shallows, was followed to the western coast, partly on rafts and not without dangerous episodes. About 55 miles of its course were traced; its navigability ceases 16 miles from the mouth, from which the last dangerous rapid is some 20 miles distant. It can by no means be called an outlet for the rich district of Tambunan, whose people are called "Great Dyaks" and rather avoided by traders.

Mr. Witt's second journey above referred to was perhaps of less interest than the first. Starting again from Marudu Bay, he turned east from Bongon, and after crossing the Bengkoka, pursued a more or less southerly route, parallel to that of the earlier part of his first journey, and coming very near it at Lansat on the Moroli. Indiarubber and guttapercha trees were frequently met with, sugar-cane was found to attain an extraordinary thickness, much beeswax was to be had, and there were frequent indications of other sources of profitable cultivation. No "Mount Kaidangan" was found, though the party travelled over its supposed position near Paliu: Mr. Witt is unable to guess what is intended by this peak, and observes that there is a rivulet, Kaidangan, discharging itself north of Paitan. Mentápok, which on the former journey seemed one peak only, being viewed "end on," was now found to consist of three pinnacles, and was thought not to equal Kinabalu in height. The position of the latter mountain, moreover, is stated to be five miles more to S.S.E. than where it now stands on the Admiralty chart: the top is not a pinnacle, as thereon appears, but an almost uniform height of four to five miles in extent. Special attention was devoted to the hydrography of the Sugut, which is apparently navigable even in a season of comparative drought from 200 to 250 miles from the sea.

From Lansat Mr. Witt continued south by the Moroli and Mangitam to the ridge (2650 feet) called Derigi dividing the drainage areas of the Sugut and Linogu systems, following the latter eastwards to Punguh. This river is doubtless the upper course of the Labuk, and it has no rapids that would interrupt it as a practicable road to the centre of the Company's Territory. It receives a fork called Kagibangan on its right bank west of the 117th meridian, and is itself called Kuananan above this junction. At Punguh, the sick men of the expedition were sent down the Linogu to the coast, which they ultimately reached in safety, and Mr. Witt with the remainder dragged his canoes over the watershed between the Linogu and Koun Koun (4 miles, about 180 feet high, through an old forest), following the latter rivulet till it changes its name to Lukan and flows into the Kinabatangan above Sebang. Much personal hardship and risk were incurred from rapids and bad weather, the canoes being often capsized, and nearly everything lost. Mr. Witt commenced a further exploration across country in the direction of the Siboku, but was obliged to abandon it, and returned in the steam-launch which had ascended the river from Elopura to Sebang.

Some further details of interest are supplied by Mr. Hatton, whose useful little book is illustrated by a sketch of Kinabalu from a drawing by Lord Elphinstone, a general Old World chart showing relative situation and size of Borneo, charts of Ambong Bay, Gaya Bay, Sandakan Harbour and Kudat Harbour, and a map of Borneo (scale 45 miles to the inch), having special reference to the Company's Territory.

It should be observed that by an accident in colouring the latter map, the island Cagayan Sulu on the 7th parallel, to the north-east, has been erroneously made to appear as if belonging to British North Borneo.

Jennings, Samuel.—*My Visit to the Goldfields in the South-East Wynaad.* London (Chapman & Hall, Limited): 1881, 8vo., pp. 82, map, illustrations. Price 5s.

The author, Secretary to two Indian Gold Mining Companies, gives a slight sketch of his personal experiences during a recent official visit to the auriferous district of the South-East Wynaad, of the richness of which he is convinced, so much so, as to consider that his little book will have a value as showing the

conditions of the country before they are completely changed, as, like Colorado, California, and Australia, he considers they must be.

The engravings (from drawings taken on the spot) are remarkably good. The map (scale 2 inches to the mile, but inverted as printed) shows the positions and boundaries of the chief gold estates.

Lansdell, Henry.—Through Siberia. London (Sampson Low & Co.): 1882, 2 vols., 8vo., pp. xviii. & 391, xii. & 404, maps, illustrations. Price 1*l.* 10*s.*

The author, after considerable personal experience in visiting prisons and hospitals in various parts of the European continent for the purpose of distributing the means of religious instruction, made a six weeks' tour in Russia in 1878 with the like object, journeying from St. Petersburg to Moscow, Jaroslav, Vologda, and Archangel; and in April 1879 (instigated in the first instance by a Finnish correspondent) he started once more with the intention of extending his operations throughout Siberia. The requisite Ministerial permission and official and other introductions were obtained with unexpected ease; and Mr. Lansdell speaks with unreserved gratitude and acknowledgment for the kindly aid extended to him by the Russian authorities. He here gives the results of his own travels, incorporating therewith much available and trustworthy published information, so that his two volumes practically contain a description of the country as a whole. At the end of the work he gives (Appendix G, pp. 390–386) a Bibliography of Siberia, and List of works and papers consulted or referred to, containing 121 references (which, however, has little pretension beyond literature in English, containing but four works in Russian, and omitting such papers as those by Hofmann, Radde, Schmidt, Meinshausen and others, in Baer und Helmersen's "Beiträge zur Kenntniss des russischen Reiches").

The chief results of Mr. Lansdell's work have already appeared in various periodicals, and the author has also read a paper on its subject before Section E at the recent meeting of the British Association at Swansea; but the more extended and detailed narrative can scarcely fail to be acceptable. His route may be briefly indicated as from St. Petersburg to Moscow, Kasan, Perm, Ekaterinburg, Tobolsk, Troitz, Tomsk, Barnaul, Marinsk, Krasnoyarsk, Irkutsk, Kiakhta, Chita, down the Amur from Nertchinsk to Nikolaievsk, thence returning up the right bank of the Amur to Khabarovka, and following the Ussuri southwards to Lake Khanka and Vladivostok, from which point he returned home via Japan and San Francisco, after a journey round the world of some 25,500 miles, nearly in a straight line. His work contains much incidental detail likely to be of practical utility to other travellers, apart from its special philanthropic and economical aspects and the convenience of its collected descriptive matter. The observations on the various races met with, especially in the extreme eastern part of the journey, are of considerable interest, as are the accounts of the actual conditions of the country at the present time.

The work is illustrated by two maps on a necessarily small scale, showing the author's route and the distribution of nationalities and tribes in Siberia—and fifty-six illustrations (some from photographs).

Phillipps-Wolley, Clive.—Sport in the Crimea and Caucasus. London (Bentley): 1881, 8vo., pp. 370 [no Index]. Price 1*4s.*

The author, late British Vice-Consul at Kertch, in his account of sporting adventures, gives much useful information on the products and present condition of the countries in which he travelled. The Crimean portion is nominal, the chief experiences being in the Caucasus, along the telegraph line at Ekaterinodar in the north-west, and from Tiflis to the Lesghian mountains, the Caspian being reached at Lenkoran.

Potanin, G. N.—Otcherki Sévero-Zapadnoi Mongolii. Resultati Puteshestvia, ispolnennago v 1876–1877 godakh po porucheniiu Imperatorskago Russkago Geographicheskago Obshchestva. Viipusk I., Dnevnik Puteshestvia i Materiali dlia fizicheskoi Geographii i Topographii S. Z. Mongolii; pp. xvi. & 425, map, plates.

Viiipusk II., *Materiali Ethnographicheskie*; pp. 181 & 87, plates. St. Petersburg (Russian Geographical Society): 1881, 2 vols. 8vo. Price 3 roubles.

Under the first general title, 'Sketches of North-Western Mongolia,' M. Potanin gives the results of his journeys in 1876-77 in the border-lands of Russia and China. Vol. I. contains his diary from post Zaisan, the starting-point of his expedition, to Kobdo, then to Hami, Uliassutai, Kossogol, Ulangoma, back to Kobdo, and return to Russian territory at Koshagatch. Besides the general description of the route, with the physical geography and topography, there are notices on Lieutenant Raffailof's march route from Ulangoma to Koshagatch, his astronomical observations for longitude with deduced positions east of Greenwich, barometrical determinations for altitudes in Mongolia, a list of birds collected by Potanin, topographical details, reference key to the map, &c. The map accompanying this volume is based on Lieutenant Raffailof's astronomical observations, and gives the heights, besides showing distinctly the territorial tribal divisions. Vol. II. is devoted to the ethnographical materials collected by M. Potanin during his two years' wanderings among tribes of Turkish and Mongol race inhabiting North-western Mongolia. They include antiquarian remains, religious customs and beliefs, legends, &c., with index, illustrations, and appendices.

Reclus, Élisée.—Nouvelle Géographie Universelle. La Terre et les Hommes, Vol. VII. L'Asie Orientale. Paris (Hachette): [1882], large 8vo., pp. 884, maps, plates. (*Dulau*: price 1*l.* 2*s.* 6*d.*)

The *magnum opus* of this distinguished author, commenced in 1876, has now reached the second volume of its Asian portion (Europe taking the first five vols.), which discusses the Chinese Empire, Corea, and Japan. It is continued on the same scheme as its predecessors, recourse being had to photographic representations wherever available, and prominent features of physical geography being as before illustrated by frequent outline maps in the text. The large coloured maps are:—Turkistan (scale 1 : 5,000,000), Russian Asia and Chinese Turkey (1 : 15,000,000), Peking and environs (1 : 400,000), Mouth of the Yang-tse (1 : 1,660,000), Canton and vicinity (1 : 870,000), the Bay of Osaka (1 : 1,600,000), and Tokio and its bay (1 : 535,000).

Sauley, F. de.—Jérusalem. Paris (Morel): 1882, imp. 8vo., pp. 336, plan and illustrations. (*Williams & Norgate*: price 17*s.*)

A profusely and excellently illustrated work on the topography, history, architecture, &c., of the Holy City, on the study of which M. de Sauley has long been occupied.

Sefer Nameh.—Relation du Voyage de Nassiri Khosrau en Syrie, en Palestine, en Egypte, en Arabie et en Perse, pendant les Années de l'Hégire 437-444 (1035-1042). Publié, traduit et annoté par Charles Schefer. Paris (Leroux): 1881, large 8vo., pp. lviii., 348, and 97 Arabic. Illuminations. (*Williams & Norgate*: price 1*l.* 1*s.*)

Forms Vol. I. of the 2nd series of Publications de l'École des Langues Orientales Vivantes. M. Schefer in the preface compares the various recorded particulars concerning Nassiri Khosrau and his life and works, and enters at some length upon various matters connected with that writer of interest to Orientalists. The body of the work contains much topographical detail as well as descriptions of historical importance.

AFRICA.

Choisy, Auguste.—Le Sahara. Souvenirs d'une Mission à Goléah. Paris (Plon): 1881, 12mo., pp. 290, map. (*Williams & Norgate*: price 3*s.*)

The author, an engineer, was employed by the French Government during the winter of 1879-1880 on the survey of the proposed railway for connecting Algeria with the basin of the Niger, which terminated so disastrously for Colonel Flatters and his party. The route taken was from Laguat southwards to the

oasis of El-Goléh, then north-east towards Wargla, traversing the Wady-Rir from south to north, and finally reaching Biskra. This region is shown on a small map.

Nachtigal, Dr. Gustav.—Sahārā und Sūdān. Ergebnisse sechsjähriger Reisen in Afrika. Zweiter Theil. Berlin (Weidmannsche Buchhandlung: Parey): 1881, 8vo., pp. 790, maps, illustrations. (*Williams & Norgate*: price 1*l.*)

The two years that have elapsed since the publication of Vol. I. (noticed in our 'Proceedings' for 1879, p. 610) have not produced an English translation, in spite of the author's scientific standing and the thorough character of his work.

The present volume contains the following books or sections, continuing those in Vol. I.:—(4) The journey to Kānem and Borkū, (5) The Lake Chad region, (6) The journey to Bagirmi.

The 4th book contains chapters descriptive of (1) the author's visit in 1871 to the Solimān tribe north-east of Lake Chad, with account of their history and present condition; (2) his journey in the Kānem country, east of and close to the Lake; (3) his journey north-east to Borkū, south of Tibesti; (4) his stay of nearly four months in Borkū; (5) Borkū and its inhabitants; (6) the land and race of the Baele, at Ennedi, south-east of Borkū, and not visited by Dr. Nachtigal; (7) tribal distribution and other ethnological matters in the eastern Sahara; and (8) his return journey to Kānem, which was reached at the end of November, by a route somewhat east of the former one.

The 5th book contains details of (1) Dr. Nachtigal's journey in south-eastern Kānem to Ngūri and Mondo; (2) his return to Kūka on the western side of the Lake; (3) the Kānem region and its inhabitants; (4) Lake Chad and its insular population; (5) Bornū and its history, with (6) its people and their ethnological peculiarities, and (7) its climate and diseases.

Book 6 describes the journey in 1872 from Bornū to the Bagirmi country, south-east of Chad, along the eastern branch (Ba Busso) of the Shari. It contains (1) details of the route, &c., to Kotoko, south of the lake; (2) of the Logon region, above the fork of the Shari; (3) the journey to Bagirmi, as far as Mafalin in Kuang, on the Shari; (4, 5, and 6) a journey south of the river in the train of the ex-king Abū Sekkin, whom he found in the Gaberi district, south of Somrai, and in whose company he was for some four months compelled to make personal experience of the horrors of slave hunting, during expeditions as far to the south as Gundi in Tummok, between the two branches of the Shari; (7 and 8) an account of Bagirmi, its ethnical surroundings, and history; and (9) the return to Bornū, and arrival again at Kuka early in September 1872.

There remains, therefore, to be described the journey east to Wadai in 1873, the exploration of the hydrography of Dar Banda to the south, and the return to Europe in 1874 through Dar Fur, with the accumulation of scientific material during the author's lengthy stay in those regions. It will be remembered that a concise account of the results of the various expeditions described in the volume now under notice was given by Dr. Nachtigal in a paper read before Section E of the British Association at Bristol in 1875, and reproduced with a sketch map in vol. xlv. of our 'Journal.'

The above-mentioned contents sufficiently indicate the main scope of the author's observations, which were especially devoted to the ethnographical, historical, and linguistic aspects of the little-known country in which he passed so many years. This work must necessarily remain the standard authority on the Chad and its hydrography, as well as for the general geography and much special topography of a large part of the south-central Sahara. The map of the Chad region (scale 1:2,000,000) accompanying this volume gives a great number of names and indications of physical features round the lake and in the Bagirmi country, as well as the commencement of the journey to Wadai, from the dry bed of the Bahr-el-Ghazāl (the occasional outlet of the lake to the north-east) through Fitri to Bulala. The route to Borkū was shown on the map with volume i. Besides this, there are three ethnographical maps of Bornū, Tubu,

and Kânem (with the Chad islands and Bâhr-el-Ghazâl), on which the distribution of the various tribes and races is shown by colours.

The volume concludes with reproductions and translations of letters, &c., from Mohammed el-Amin el Kâremi, and, meteorological tables containing observations from Aug. 1870 to Feb. 1873, made at the various localities above specified.

Oliphant, Laurence.—The Land of Khemi. Up and down the Middle Nile. London (Blackwood): 1882, cr. 8vo., pp. 260, illustrations [no Index]. Price 10s. 6d.

Reprinted from articles in 'Blackwood's Magazine,' discussing the Fayum (the ancient Arsinoite Nome), the Labyrinth and Lakes, with special reference to the ancient artificial hydrography of Lake Morris, and an account of some excavations at Isembheb.

AMERICA.

Hesse-Wartegg, Ernst von.—Mississippi-Fahrten. Reisebilder aus dem amerikanischen Süden (1879–1881). Leipzig (Reissner): 1881, 8vo., pp. 354, illustrations. (*Williams & Norgate*: price 8s.)

Chiefly refers to the present aspects of the cotton-producing area.

Margry, Pierre.—Mémoires et Documents pour servir à l'histoire des Origines Françaises des Pays d'Outre-Mer. Découvertes et Établissements des Français dans l'Ouest et dans le Sud de l'Amérique Septentrionale (1694–1703). Vol. IV. Paris (Maisonnette): 1881, 8vo., pp. lxxii. & 653, portrait. (*Dulau*: price 12s.)

The secondary title of this 4th part of the interesting geographico-historical work of which the first 3 vols. are noticed in our 'Proceedings' for 1879, pp. 285 and 286, is:—"Découverte par Mer des bouches du Mississippi et Établissements de Lemoyne d'Iberville sur le Golfe du Mexique (1694–1703)"; and the volume continues the account of the French discoveries and settlements in North America after the death of De la Salle. The chief interest is political and historical, but chapters 2–6 contain the first voyage of D'Iberville (of whom an excellent portrait is given), including his discovery of the mouth of the Mississippi by sea, and establishment of a military post in the Bay of Bitoxi (1698–1699); chapters 7–10 comprise his second voyage, in which he ascended the river to Natchez, established fort Maurepas, and discovered the Red River (1699–1700); and chapters 12–14, his third voyage, with the foundation of Mobile (1701–1702). Justificatory and explanatory documents (some historically new) are added to the text.

Orozco y Berra, Manuel.—Apuntes para la Historia de la Geografia en México. México (De Leon): 1881, 8vo., pp. 503.

A sketch of Mexican history and geography from 1506. Chapters IV. and V., pp. 20–59, contain sixty-five bibliographical notices on the cartography of early America; and Chapters VI. to VIII. discuss various ancient atlases and charts, comparing them with modern maps. The development of the State both geographically and politically is described according to the chronological order of events; and special attention is drawn to recent official work in this direction.

ARCTIC.

Nordenskiöld, A. E.—The Voyage of the *Vega* round Asia and Europe, &c. London (Macmillan): 1881, 2 vols., 8vo.

In the notice of this work on p. 64 of the present volume of 'Proceedings,' attention was drawn to the apparent fact that it contained no Index. Baron Nordenskiöld having informed the writer of this Bibliography that his own copy at least possessed that important adjunct, application has been made to the publishers for an explanation, and a reply has been received that, being bound to issue the work at a certain date, and the Index not being ready, some copies were published without it. This want has been supplied in the

individual instance by them; but it should be remarked that there is no reference in the table of Contents to the existence of an Index, and that the review of the work in the *Athenæum* especially drew attention to the want of one.

GENERAL.

Klein und Thomé.—Die Erde und ihr organisches Leben. Ein geographisches Hausbuch. Vol. II. Thier- und Pflanzen-Geographie. Nach der gegenwärtigen Verbreitung der Thiere und der Pflanzen, sowie mit Rücksicht auf deren Beziehung zum Menschen, dargestellt von Dr. Otto Wilhelm Thomé. Stuttgart (Spemann): [1881], 8vo., pp. 652, plates and woodcuts. (*Williams & Norgate*: price 14s. 6d.)

This profusely and well illustrated volume is somewhat on the same scheme as Wallace's well-known work, but with less zoological detail, the geographical aspects being kept more in view, and with the addition of botany.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

EUROPE.

Austrian Government.—Umgebung von Bruck A. D. Leitha. Scale 1:25,000 or 2·9 inches to a geographical mile. Sheets:—A 4 (Mannersdorf), A 5 (Donnerskirchen), B 4 (Breitenbrunn), B 5 (Neusiedler See), C 1 (Hainburg), C 5 (Weiden), D 1 (Wolfsthal), D 5 (Wittmannshof). K. k. militär. geografisches Institut, Wien, 1881. Price 1s. 2d. each sheet. (*Dulau*.)

— Umgebung von Wien. Scale 1:25,000 or 2·9 inches to a geographical mile. Sheets:—A 7 (Fahrafeld), A 8 (Pernitz), B 7 (Pottenstein), B 8 (Hornstein), C 8 (Sollenau), D 7 (Ebreichsdorf), D 8 (Pottendorf), E 7 (Seibersdorf), E 8 (Loretto). K. k. militär. geografisches Institut, Wien, 1881. Price 1s. 2d. each sheet. (*Dulau*.)

Bizet, A.—Carte de la Grèce. Migeon, Paris. Price 3s. (*Dulau*.)

Dépôt des Fortifications.—Carte de France, dressée au dépôt des fortifications. Scale 1:500,000 or 6·8 geographical miles to an inch. Feuille VI. Mulhouse, Karlsruhe, Mannheim, Strasbourg, Bâle. Paris. Price 1s. (*Dulau*.)

Dépôt de la Guerre, Paris.—Carte de la frontière des Alpes. Scale 1:320,000 or 4·3 geographical miles to an inch. Sheets:—1. Mâcon, 2. Gd. St. Bernard, 3. Lyon, 4. Albertville, 5. Valence, 6. Briançon, 7. Avignon, 8. Nice, 9. Marseille, 10. Draguignan. Dépôt de la Guerre, Paris. Price 1s. 3d. each sheet. (*Dulau*.)

— Carte du Massif des Alpes. Scale 1:80,000 or 1·1 geographical mile to an inch. Sheets:—Albertville, Allevard, Barcelonnette, Bardonnèche, Beaufort, Bonneval, Bozel, Briançon, Castellane, Chamousset, Colmars, Comps, Fenestrelle, Gap, La Motte du Caire, Larche, Le Bourg-d'Oisans, Les Mées, Modane, Mont-Dauphin, Moutiers, Nice, Ormes, Petit St. Bernard, Queyras, Riez, St. Bonnet, St. Firmin, St. Jean de Maurienne, Seyne, Suse, Tignes. Dépôt de la Guerre, Paris. Price 1s. 4d. each sheet. (*Dulau*.)

Prussian Government.—Karte des Deutschen Reiches. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—22. Tondern, 81. Hademarschen, 88. Eutin, 112. Itzehoe, 113. Segeberg, 469. Annaberg. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme, 1881. Price 1s. 6d. each sheet. (*Dulau*.)

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13; 5s. Area Book 1s. Olveston, Sheets LIV.—16; LXIII.—14; 3s. 6d. each. LIV.—15; LXII.—4, 8, 12, 16; LXIII.—9, 10; LXVII.—4; LXVIII.—1; 4s. each. LXII.—3; 4s. 6d.; LXVII.—3; 5s. Area Book 1s. 6d. Staunton, Sheets XXX.—11, 14; 2s. 6d. each. XXXVIII.—2; 3s. XXX.—15; XXXVIII.—3; 3s. 6d. each. Area Book 1s. St. Briavels, Sheets XXXVIII.—14; XLVII.—5; 2s. 6d. each. XXXVIII.—16; XLVI.—4, 11; XLVII.—1; 3s. each. XXXVIII.—11, 15; XLVI.—2, 6, 7, 10; 3s. 6d. each. XXXVIII.—12; 4s. XXXIX.—13; 5s. Area Book 2s. Tidenham, Sheets XLVI.—11, 14; LIV.—14; 3s. each. XLVI.—10, 12, 15, 16; LIV.—2, 4, 6, 8, 11, 12; LXII.—6; 3s. 6d. each. LIV.—7, 10, 15; LV.—5; LXII.—7; 4s. each. LXII.—3; 4s. 6d. Area Book 1s. 6d. Westbury upon Trym (Det., Nos. 1 to 42), Sheets LXXI.—10; 2s. 6d. LXXI.—5; 3s. LXVII.—12, 13, 16; LXXI.—4; 3s. 6d. each. LXII.—12, 16; LXVII.—10, 15; LXXI.—3; 4s. each. LXVII.—14; LXXI.—1, 2, 6; 4s. 6d. each. Winterbourne (Det., No. 1), Sheets LXVIII.—6, 10; 3s. 6d. each. Area Book 1s. Woolaston, Sheets XLVI.—11, 3s. XLVI.—7, 10, 12, 15, 16; LIV.—4, 8; LV.—1; 3s. 6d. each. XLVII.—9, 13, 14; LV.—2, 5; 4s. each. Area Book 1s. 6d. Oxford: Charlbury, Sheets XXI.—9, 13, 14; XXVI.—2, 6; 2s. 6d. each. XX.—2, 3, 4, 10, 14; XXV.—3; XXVI.—5; 3s. each. XIV.—14, 15; XX.—6, 7, 8, 12, 15; XXV.—4, 8; XXVI.—1; 3s. 6d. each. XX.—11; 4s. XX.—16; 4s. 6d. Chipping Norton, Sheets XIV.—6, 8; 3s. each. XIV.—7, 10, 12, 14, 15, 16; 3s. 6d. each. XIV.—11; 5s. Churchill, Sheets XIX.—12; 2s. 6d. XX.—2, 3; 3s. each. XIV.—13, 14, 15; XX.—5, 9; 3s. 6d. each. XX.—1; 4s. Area Book 1s. Cornwell, Sheets XIV.—5; 3s. XIV.—9, 10, 13, 14; 3s. 6d. each. Area Book 1s. Cottisford, Sheets XVII.—2, 3; 2s. 6d. each. XI.—15; XVII.—6; 3s. each. Area Book 1s. Enstone, Sheets XV.—14; XXI.—2, 3, 5, 6, 10, 14, 15; 2s. 6d. each. XV.—9; XX.—4; XXI.—7; 3s. each. XIV.—12, 15, 16; XV.—13; XXI.—1; 3s. 6d. each. XV.—15; 4s. Area Book 1s. Finmere, Sheets XVII.—3, 4; 2s. 6d. each. XI.—11, 15; 3s. each. XI.—12, 16; 3s. 6d. each. XII.—9; 4s. Area Book 1s. Hethe, Sheets XVII.—2, 3, 10; 2s. 6d. each. XVII.—6; 3s. XVII.—7; 3s. 6d. Area Book 1s. Kingham, Sheets XIV.—9, 13; XX.—5; 3s. 6d. each. XX.—1; 4s. Area Book 1s. Mixbury, Sheets XVII.—3; 2s. 6d. XI.—11, 15; XVII.—6; 3s. each. XI.—12; XVII.—7; 3s. 6d. each. XI.—7, 8; 4s. each. Area Book 1s. Sarsden, Sheets XIX.—12; 2s. 6d. XX.—2, 3; 3s. each. XX.—5, 6, 9; 3s. 6d. each. XX.—1; 4s. Area Book 1s. Westcot Barton, Sheets XXI.—3, 4, 8; 2s. 6d. each. XV.—12; XVI.—9; 3s. 6d. each. XV.—15, 16; XVI.—13; 4s. each. Shropshire: Chetwynd, Sheets XXIII.—14; 2s. 6d. XXIV.—13; 3s. XXIII.—6, 10, 11, 15; XXXI.—1; 3s. 6d. each. XXIII.—7; XXX.—4; 4s. each. XXX.—8; 5s. XXXI.—5; 5s. 6d. Area Book 1s. Cherrington, Area Book 1s. Stafford: Alton, Area Book 3s. Blore, Area Book 2s. Ellastone, Area Book 2s. 6d. Ilam, Area Book 1s. Okeover, Sheets XIV.—12, 16; 3s. 6d. each. XV.—9, 13; 4s. each. Area Book 1s. Ranton Abbey, Sheets XXXVI.—7, 11; 3s. 6d. each. XXXVI.—8, 12, 15; 4s. each. Area Book 1s. Rocester, Sheets XXVI.—5; 3s. 6d. XX.—14, 15; XXVI.—2, 3; 4s. each. Area Book 2s. Sleighford, Sheets XXX.—13, 14; XXXVI.—16; XXXVII.—2, 13, 14; 3s. 6d. each. XXXVI.—4, 8, 12; XXXVII.—1, 5, 6, 9, 10; 4s. each. Area Book 1s. 6d. Suffolk: Bawdsey, Sheets LXXXIV.—14; 2s. 6d. LXXXIV.—4 (11 and 15); 3s. 6d. each. LXXXIV.—6; LXXXVII.—16; 4s. each. LXXXIV.—3, 7, 10; 4s. 6d. each. Wilts: Great Wishford, Sheets LIX.—(11 and 15), 16; LX.—13; LXV.—3, 4, 8; LXVI.—1; 2s. 6d. each. LIX.—12; 3s. 6d. LXVI.—5; 4s. Area Book 1s. Idmiston (Det.), No. 2, Winterbourne Gunner (Det.), Winterbourne Earls (Det.), and Winterbourne Dauntsey (Det.), Sheets LXVI.—8; 2s. 6d. Area Book 1s.

SCOTLAND: Orkney and Shetland (Orkney). Sheets XCVI.—8, 15; XCVII.—9; CIII.—3, 7, 10; 2s. 6d. each. XCVI.—11, 12; XCVII.—7, 11; 3s. each. XCVI.—16; XCVII.—6, 10, 13, 14; CII.—4, 8; CIII.—1, 2, 5, 6; 3s. 6d. each. Area Book 1s. 6d.

Town Plan—Scale 1 : 500 :—

IRELAND: New Ross (15 Sheets).—XXIX. 10—20, 25; XXIX. 11—16, 17, 18, 21, 22, 23; XXIX. 14—5, 10; XXIX. 15—1, 2, 6, 7, 12; 2s. each.

Index Maps :—

Indices to 6-inch County Maps: Kent.—(Scale 1 inch to a mile), Price 2s. 6d. Middlesex.—(Scale 2 miles to 1 inch), Price 2s. 6d. (*Stanford, agent.*)

The plans of the undernamed Parishes were in the first place published in an incomplete state, in consequence of some of the sheets containing parts of co-terminous Parishes which were not ready for publication. These sheets having now been published, the entries in the body of the Catalogue are to be corrected by the insertion of their numerals.

25-inch—Parish Maps :—

ENGLAND AND WALES: **Brecknock**: Llanelly, Sheets XLI.—12; XLVIII.—5; 2s. 6d. each. XLII.—9, 10; XLVIII.—1; 3s. 6d. each. XLII.—13, 14; 4s. each. The publication of these sheets completes the plan of the Parish of Llanelly; the total number of sheets is now 12. **Llangattwg**, Sheets XLI.—4, 12; 2s. 6d. each. XLI.—2, 3; 3s. 6d. each. XLI.—8; 4s. The publication of these sheets completes the plan of the Parish of Llangattwg; the total number of sheets is now 19. **Llangynidr**, Sheets XL.—4, 15; XLVI.—3, 7; 2s. 6d. each. XL.—8, 11; 3s. each. XLI.—2; 3s. 6d. XLI.—1; 4s. The number of sheets published is now altered to 25; it is not yet complete. **Buckingham**: Wing, Sheets XX.—14; 3s. XXIV.—3; 3s. 6d. The publication of these sheets completes the plan of the Parish of Wing; the total number of sheets is now 16. **Cornwall**: St. Merryn, Sheet XVIII.—16; 2s. 6d. The publication of this sheet completes the plan of the Parish of St. Merryn; the total number of sheets is now 12. **Derby**: Fenny Bentley, Sheets XXXVIII.—9, 13; 4s. each. The publication of these sheets completes the plan of the Parish of Fenny Bentley; the total number of sheets is now 6. **Kirk Langley**, Sheets XLIX.—3, 7, 10; 3s. 6d. each. The publication of these sheets completes the plan of the Parish of Kirk Langley; the total number of sheets is now 8. **Tissington**, Sheets XXXVII.—4; XXXVIII.—10; 2s. 6d. each. XXXVII.—8; 4s. The publication of these sheets completes the plan of the Parish of Tissington; the total number of sheets is now 9. **Gloucester**: Sheets LXIII.—1, 5; 3s. 6d. each. LV.—5; LXII.—4; LXIII.—10; 4s. each. The publication of these sheets completes the plan of the Parish of Thornbury; the total number of sheets is now 26. **Oxford**: Shipton-on-Cherwell, Sheet XXVI.—4; 2s. 6d. The publication of this sheet completes the plan of the Parish of Shipton-on-Cherwell; the total number of sheets is now 5.

Town Plan :—Scale 1 : 500 :—

ENGLAND: Stafford, Sheets XXXVII. 11.—2, 3, 7, 12, 16, 17, 18, 21, 22, 23; XXXVII. 15.—1, 2, 6, 7, 8; 2s. each. The publication of these sheets completes the plan of the Town of Stafford; the total number of sheets is now 24.

The Zincographs of the undernamed Ordnance Survey Plans having been sold out, another edition has been printed, and is now ready for sale. No revision of the original plans having taken place, these impressions are similar to those already issued to the public, except when otherwise specified.

6-inch—County Maps :—

ENGLAND AND WALES: Hants, Sheet XV. Pembroke, Sheet XXXIX.

25-inch—Parish Maps :—

ENGLAND AND WALES: **Berks**: Enborne, Newbury, and Sandleford, Sheet XLII. 8. **Chester**: Ashton-upon-Mersey, Bowdon, and Northenden, Sheet

IX. 15. Astbury, Sheet LI. 7. Christleton, Plemstall, Guilden Sutton, St. John the Baptist, and St. Oswald (Det., No. 3), Sheet XXXVIII. 12. Gawsworth, and Prestbury, Sheet XLIII. 6. Mottram in Longendale, Sheet IV. 3. Prestbury, Sheet XXXVII. 9. **Cornwall**: Botus Fleming, and St. Stephens, Sheet XXXVII. 6. Sheviok, and St. Germans, Sheets XLV. 14, LIV. 2. Sheviok, St. Germans, and St. Erney, Sheet XLV. 10. St. Germans, and St. Erney, Sheet XLV. 6. St. Stephens, Antony and Do. (Det.), Sheet XLVI. 5. **Cumberland**: Warwick, Sheet XVII. 14. Parts of the Parishes of Crosby-upon-Eden, Irthington, and Hayton added. **Denbigh**: Denbigh, Llanrhaiadr yn Cinmerch, and Henllan, Sheet XIII. 8. **Devon**: Bickleigh, Egg Buckland, and Tamerton Foliot, Sheet CXVIII. 9. Brixton, Plymstock, and Wembury, Sheet CXXX. 2. Chelson Meadows (Ex. Par.), Plympton St. Mary, Plymstock, and Plympton Maurice, Sheet CXXXIV. 6. Paignton, Sheet CXXII. 9. Tamerton Foliot, Sheet CXVII. 8. **Essex**: Barking, East Ham, and West Ham, Sheet LXXIII. 16. Cranham, Sheet LXVII. 14. Parts of the Parishes of Great Warley, Upminster, and Hornchurch added. Dagenham, Hornchurch, and Romford, Sheet LXXIV. 4. Dagenham, Hornchurch, and Rainham, Sheet LXXXII. 3. Dunton, East Horndon, Ingrave, and Little Burstead, Sheet LXVIII. 9. Nazeing, and Roydon, Sheet XL. 14. Shenfield, and South Weald St. Nicholas, Sheet XXI. 7. Parts of the Parishes of Shotley, Trimley St. Mary, and Walton (Sheet LXXXIX, 7, Co. Suffolk) added. Tendring Hundred, Sheet XXI. 6. Parts of the Parishes of Shotley and Ervarton (Sheet LXXXIX, 6, Co. Suffolk) added. **Glamorgan**: Aberdare, and Merthyr Tydfil, Caerau, Llandaff, Leckwith, Michaelston super Ely, and St. Fagans, Sheet XLIII. 13. Eglwysilan, and Llantwit Fardre, Sheet XXXVI. 4. Eglwysilan, Sheet XXVIII. 12. Gelligaer, Sheets XII. 16, XIX. 8. Llandaff, Roath, St. Mary, and St. John, Sheet XLIII. 15. Merthyr Tydfil, Sheet XII. 10. Ystrad Dyfodwg, Sheet X. 12. Gelligaer, Sheet XX. 1, and **Monmouth**: Bedwelty, Sheet XXII. 1. **Gloucester**: Flaxley (Det., No. 1), Forest of Dean, Hinders Lane, Little Dean, and Newland (Det., No. 10), Sheet XXXI. 11. Forest of Dean, Sheet XXX. 16. Parts of the Parishes of Newland and English Bicknor added. Forest of Dean, Sheet XXXVIII. 8. Part of the Parish of Newland added. Forest of Dean, Sheet XXXVIII. 12. Parts of the Parishes of Newland and Do. (Det., No. 12), and St. Brinvels added. **Hants**: Alton, Area Book. St. Peter Cheesehill, Chilcomb, Easton, Winnall, No Man's Land (Ex. Par., Nos. 1 and 2), St. John, St. Peter, and St. Bartholomew Hyde, Sheet XLI. 14. Eling, Sheet LXV. 13. Part of the Parish of Dibden added. Holy Rood, St. John, and St. Michael, Sheet LXV. 14. Parts of the Parishes of Eling and Dibden added. **Hertford**: Cheshunt, Sheet XLI. 3. **Kent**: Chartham and Chilham, Sheet XLV. 16. Folkestone, Sheet LXXV. 10. Frittenden, Sheet LXIII. 10. Part of the Parish of Headcorn added. Newington, Sheet XX. 15. Parts of the Parishes of Hartlip and Upchurch added. **Middlesex**: Edgware, and Hendon, Sheet VI. 10. Parts of the Parishes of Totteridge and Chipping Barnet (Sheet XLV. 10, Co. Herts) added. New railway inserted 1870. Harrow-on-the-Hill, Sheet V. 11. Parts of the Parishes of Bushey and Watford (Sheet XLIV. 11, Co. Herts) added. **Monmouth**: Aberystroth, Sheet XI. 11. Aberystroth, and Bedwelty, Sheet XVII. 7. **Shropshire**: St. Martin, Sheet V. 14. **Stafford**: Audley, and Wolstanton, Sheet XI. 7. **Surrey**: Egham and Thorpe, Sheet V. 13. Warlingham, Sheet XX. 11. Part of the Parish of Sanderstead added. **Sussex**: Holy Trinity, Hollington, Ore, St. Mary-in-the-Castle, St. Leonard's, St. Mary Magdalen, and St. Andrew's, Sheet LVIII. 14. Ifield, Upper Beeding (Det.), and Ruper, Sheet III. 10. Mayfield, and Rotherfield, Sheet XVII. 16. **Westmorland**: Morland, Sheet IX. 5. Parts of the Parishes of St. Michael Appleby, Kirby Thore, and Long Marton added. New railway 1865. Morland, Sheet VIII. 12. Orton, Sheet XXVIII. 12. **Wilts**: Bramshaw, Sheet LXXXII. 1, and **Hants**: Minstead, and Eling, Sheet LXIV. 1. **Wilts**: Bramshaw, Sheet LXXXVIII. 13, and **Hants**: Eling, and West Wellow, Sheet LVI. 13.

SCOTLAND: **Aberdeen**: Newhills, and Old Machar, Sheet LXXV. 1. **Pitlochry**: Sheet II. 2. **Ayr**: Kilmarnock, Kilmaurs, and Riccarton, Sheet XVIII. 1. **Lanark**: Old Monkland, Rutherglen, and Shettleston, Sheet XI. 1. **Newcastle**: Railway inserted 1870. Part of the Parish of Cambuslang added. Sheet IX. 16.

Town Plans:—

ENGLAND AND WALES: London (scale 1:2500), Sheet LIV. Buxton (scale 1:500), Sheet XV. 13, 7. Barrow-in-Furness (scale 1:500), Sheet XX. 12, 6. Rochester (scale 1:500), Sheet XIX. 7, 11. Wrexham (scale 1:500), Sheet XXVIII. 12, 13.

SCOTLAND: Edinburgh (6-inch scale), Sheets XII, XVII., on thin paper. Edinburgh (5-feet scale), Sheets XIII. (Revised in 1876), XXIX, XXXI, XXXVI. (revised in 1877).

Index Maps:—

ENGLAND: Index to the County of Shropshire (scale 4 miles to 1 inch). Index to the County of Somerset (scale 4 miles to 1 inch). Index to the 6-inch Map of Lancashire. (Stanford, agent).

AFRICA.

Kiepert, Richard.—Ed. Robert Flegel's Reise von Rabba nach Sokoto und zurück. 18 October, 1880—16 April, 1881. (Aufnahme des mittleren Niger und des unteren Gülbī-n-Gindi.) Scale 1:600,000 or 8·1 geographical miles to an inch. Redaction von Richard Kiepert. Mitth. d. Afrikan. Ges. in Deutschland. Bd. III. Taf. 2. Autogr. v. Wilh. Droysen. Druck v. H. S. Hermann in Berlin. (Dulau.)

AMERICA.

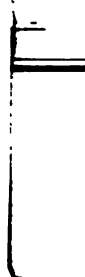
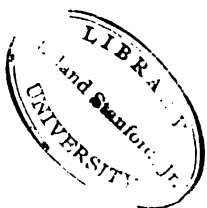
Chilian Hydrographic Office.—Carta que demuestra las diversas proposiciones de arreglo de la cuestion de límites Chileno-Arjentina. Santiago de Chile. Publicado de orden del Supremo Gobierno i bajo la direccion de la Oficina Hidrográfica, en Agosto de 1881. Edicion del "Mercurio."

This map shows the new boundary between the Argentine Republic and Chili; it will be seen that Chili has a clear waterway between the Pacific and Atlantic Oceans, and a small seaboard on the latter, at the entrance of the Straits of Magellan. The boundary runs down the 73° meridian west of Greenwich, to 51° 30' S., then skirts the eastern shores of the Straits of Ultima Esperanza until it reaches the 70° meridian west of Greenwich, it here turns to the south-east and reaches the Atlantic midway between C. Virgenes and Pt. Dungeness. In Tierra del Fuego the boundary runs due north and south in longitude 68° 33' west of Greenwich. This portion of Tierra del Fuego, acquired by the Argentine Republic, is supposed to possess great mineral wealth; Beagle Channel is the southern boundary, and Staten Island remains a portion of the Argentine Republic.

AUSTRALIA.

Watson, Robt., C.E., M. Inst. C.E.—Map of Queensland, showing proposed Trans-continental Railway and Grand Trunk line to South Australia, also Mr. Watson's Railway Expedition 1881. Scale 1:3,400,000 or 46·3 geographical miles to an inch. To accompany Mr. Watson's 'Report on Trial Survey of proposed route for Trans-continental Railway from Roma to Point Parker.' Photolithographed at the Lands Department, Brisbane. 1881.





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Across Iceland by the Sprengisandr Route.

By CUTHBERT E. PEEK.

(Read at the Evening Meeting, January 30th, 1882.)

Map, p. 192.

ALTHOUGH many persons annually visit Iceland, there are few who travel far into the interior to examine the barren wastes and lava fields which exist in the centre of the island. Last July Mr. Coles, Mr. Delmar Morgan and myself, left Leith by the mail-steamer *Valdemar* to explore this little-known country. The chief objects that we had in view were, to visit and examine the world-famed Geysir, and the hot springs in its immediate vicinity, to traverse the little-known Sprengisandr route, and, if possible, to fix the northern termination of the great lava stream which flowed from Askja in 1875.

The route towards Geysir passing by Thingvellir is so well known that it requires but little description, suffice it to say that the road that on starting I described in my journal as execrably bad, I entered on the return journey as exceedingly good, having quite forgotten the mention I had made of it about five weeks previously. Before leaving the island, one's ideas of good and bad when applied to roads are considerably modified. The first halting-place is at Thingvellir, where for more than a thousand years the parliament assembled, and it was here that in 1874 the King of Denmark granted the Icelanders their long-wished-for constitution. Thingvellir is approached through an enormous rift which gives one the idea of the entrance to a giant's castle, the gateway being guarded by immense boulders, masses of which have fallen from the towering cliffs above. The place where the Althing held its assemblies is surrounded by a deep chasm, and is of oval form. This chasm extends to a vast depth, and at about 30 feet from the level of the ground flows one of the affluents of the lake, the water being in many places more than 100 feet deep; it is impossible to imagine a more secure place for an assembly to have met in troublous times when the

whole country was disturbed by perpetual feuds between petty chieftains. It was here that we noticed the first of the subterranean rivers with which Iceland abounds, and which appears to be caused by the river having been, at some remote date, overwhelmed by a flood of lava, and compelled to find its way through the rifts created by the cooling of the molten stream.

On the evening of our arrival we took observations with a boiling-point thermometer in order to discover any error in our aneroid readings, as we feared that a jog-trot of ten hours' duration might have put the instrument somewhat out of adjustment. We were, however, agreeably surprised to find that our misgivings were not fulfilled, as the two readings coincided most satisfactorily. Next morning an early start was made for Geysir, the road leading through one of the small copses which are dignified by the name of woods; it consisted of scrub birch in no part more than four feet high, and in many places hardly double that number of inches. The route lay along the western edge of a large plain in which we noticed several boiling springs. These springs might easily be taken for railway engines standing at a station giving out volumes of steam, and invest the country with an appearance of life which it is far from possessing. The word Geysir is a proper name, in the singular number, but I have throughout this paper used it in its colloquial and usually accepted sense as referring to the whole of this system of springs.

Towards evening we saw in front of us a vast quantity of vapour issuing from the ground, and soon found that we were approaching the celebrated Geysirs. On reaching them we discovered that the vapour we had noticed issued from a number of small holes in the ground, but as the evening was far advanced we deferred any closer examination till next day. I may here mention that in several plans of the Geysirs that have been made, an error with regard to the points of the compass has crept in, in some cases magnetic North has been used and laid down as true north, while in others the correct amount of variation has been allowed, but unfortunately the wrong way. This circumstance may, in part, account for the statement of some travellers, that the compass is of no use in Iceland. The truth of the matter is, that the difference between true and magnetic north is about 41° or nearly 4 points westerly variation. Another reason that we had for believing in the accuracy of the compass was that we found that the results we obtained from our observations for sun's true azimuth taken at many stations gave us errors in our compass very nearly coincident with the curves of variation as laid down on the Admiralty "Variation Chart," thus showing the absence of local attraction. Mr. Coles also took the dip of the needle in many places along the route, and found that it varied only from 79° to 81° . Now as any magnetic disturbance would affect all the elements, we came to the conclusion that these reputed eccentricities were either

entirely absent or were so small as to be inappreciable with ordinary travellers' instruments. In making these remarks I, of course, except the immediate proximity of magnetic rocks.

Next day we proceeded to make a careful examination of the Geysir system. The whole series of springs lie at the western base of a moderately high hill, and runs N.N.E. and S.S.W., the Great Geysir being at the northern end of the system and the spring marked R on the map at the southern end; the land slopes gradually from Great Geysir to R. The ground on which they are situated has very little vegetation, and what there is, is of inferior quality, as we noticed that the ponies as soon as they were turned loose started at a quick trot to the Haukadalr. It was also noticeable that the cotton-grass (*Eriophorum angustifolium*) which flourishes in almost all swampy places throughout the island, is entirely absent from the ground left moist by the water from these springs.

I will now attempt to give an account of the three most important and also of the smaller springs which in the plan are designated by letters. I must here mention that the whole of the angles were taken by Mr. Coles with a sextant, and I can vouch for the care taken in each observation; my own share in this part of the undertaking was to act as a station mark, a duty not altogether unattended with risk when surveying the system of small springs. The Great Geysir, as its name implies, is the largest of the series. A cone, or more properly speaking a mound created by the deposition of the substances held in solution by the water, rises above the surrounding ground, and on the top of this mound is its basin, which is 56 feet in its greatest diameter, and 49 feet in its least.

The following is an analysis of the water of the Great Geysir as given by Dr. Black. The mineral contents of a gallon of the water are soda 5.56 gr., alumina 2.80 gr., silica 31.38 gr., muriate] of soda 14.42 gr., sulphate of soda 8.57 gr. It is worthy of remark that this deposit close to the water's edge is so hard that it was almost impossible to detach even the smallest fragment with a geologist's hammer, while lower down the side of the cone large pieces could be pulverised in the hands.

The basin of the Great Geysir is of an oval form, and shelves gradually from the bank to a depth of about three feet at the edge of the central funnel. This central funnel is about 15 feet in diameter and (roughly) circular. We had brought with us some rope and a block in order to ascertain the depth, and Mr. Delmar Morgan had provided himself with a registering thermometer, carefully constructed, having a large spiral spring at the under side in order to prevent any jar to the index, in the event of its striking against a rock at the bottom. On lowering this thermometer we found that it touched the bottom at a depth of 78 feet, and on hauling it up again found that the index registered a tempera-

ture of 228° F. We took a considerable number of soundings, but only twice got the instrument to descend to this depth; on all other occasions it lodged on a rock at 35 feet from the surface; from this we imagine that at the latter depth the funnel suddenly contracts, but of course the internal shape of the tube must to a great extent be a matter of conjecture.

Just as we had finished our observations we heard the mysterious booming sound which is the warning of an impending explosion, and as we had all seen illustrations of what Geysir can do when aroused, we fled for safety in various directions. However, he was not disposed to give any great exhibition of his powers, and only threw a column of water about five feet into the air, very much resembling the picture of the Apollinaris Brunnen on the Apollinaris water bottles. As long as it is in a state of rest a small channel about four inches square is enough to carry off the water which rises from the spring, but as soon as the booming noise commences, which we noticed was about once in six hours, the water overflows the banks on all sides, and thus adds to the deposit which forms the cone. We were told that a grand eruption had taken place the day before our arrival, and that they usually occurred about once in three days.

The spring next in importance is Strokkur, which is always prepared to display its powers when properly called on to do so. The mode of treatment in order to get a satisfactory exhibition is to feed it, but in this case the food consists of about a barrowful of turf, which is thrown down the circular hole about 10 feet in diameter and 42 feet deep, and which after remaining in the water from ten minutes to half an hour is violently ejected to a height of at least 100 feet. An exhibition can always be obtained by feeding it in this way, but the height to which the water is thrown varies considerably. The temperature of the water is 228° F. It is ejected without the slightest warning; so sudden are the eruptions that on one occasion our note-book got almost washed into the river. We had put it down while throwing turf in, and had forgotten it till an eruption was imminent, when we were unwilling to risk the probable chance of being boiled to save it.

The next important spring is Blesi, which has a double basin connected by a narrow channel. This may truly be called the traveller's friend, as it saves him, during the whole time of his stay, the trouble of making a fire. The water is beautifully clear and about 20 feet deep. We cooked all our food, either by putting it (in the case of game) into a cloth and lowering it into the water, or by standing the kettle in the small stream which flows from it. Although the temperature of the water is only 180° F. the alkali in it causes it to make as good tea as if it boiled. These springs, Great Geysir, Strokkur, and Blesi, appear to be intimately connected, especially the two former, as we noticed that when Great Geysir overflowed its banks, Strokkur was almost emptied,

and that Great Geysir and Blesi were always in a state of ebullition at the same time, though the ebullition of Blesi (fortunately for our culinary operations) was limited to a few bubbles of air. The rumbling sound (as far as we could judge when in the tent) appeared to come from a spot midway between Strokkr and Great Geysir.

From the reports of travellers at the commencement of this century it would seem that these springs are not so active now as they were then, since Mackenzie mentions an eruption of Strokkr which lasted more than half an hour, while at present the duration is only a few minutes. Half-way between Great Geysir and the system of small springs is situated one which has been called by visitors Little Geysir, which at times ejects a considerable quantity of water, throwing it to a height of about six feet.

We now come to the large system of small springs which constituted a somewhat hazardous part of the survey. They are situated in a rough triangle, A, B, and R being the three angles. It was requisite first of all to give each spring a distinguishing letter so as to identify it, and this we did by marking the letter on the sandy deposit. In measuring the subtended angles with a sextant it was of course necessary that the opposite end of the base and the position of the spring to which the angle was being taken, should be visible to the observer simultaneously, and in order to attain this end I had to stand at each spring as a station mark, it would have occupied too much time to set up one for each angle, besides which I question if any attempt to drive a stake into the ground would not have been followed by such a rush of steam or superheated water as would probably have brought my surveying to a premature end. As it was, much difficulty was experienced in taking the necessary angles, and we often had to wait a very considerable time before a favourable gust of wind blew the steam clear for a few moments. Another great difficulty was that the vapour laden with sulphur condensed on the horizon and index glasses of the sextant, and rendered them useless until carefully wiped. As will be seen from the plan, the whole ground is full of hot springs of various sizes and depths, and in continually changing stages of ebullition. Thus a spring which we marked on the first examination as merely a hot spring, was shortly after in a violent state of agitation. The fact of the matter seems to be that the whole of the springs in this system are connected, and that the earth is merely a thin crust originally covering a subterranean lake, which has now forced its way to the surface in the manner depicted. Judging by the apparent thinness of the crust, I believe that any one with a pickaxe or crowbar could soon create a completely new system of hot springs. I must add that the only mud-spring in the district is at A, and is always in a violent state of ebullition. I shall have more to say later on about these mud-springs.

From Geysir we visited Gullfoss, which is one of the most magnificent

falls in Iceland, and is situated about two hours' ride to the east of Geysir. At this spot the river Hvítá falls about 180 feet in two steps, and at the time of our visit was very full of water caused by the melting of the snow on Langjökull. It was at this spot, our guide informed us, that criminals were executed by being thrown into the rapidly flowing current above, and left to be dashed to pieces on the rocks below.

Having finished our survey of the Geysir system we started for Hekla, and in our journey had to cross the dangerous river Hvítá. It is necessary at almost all the large or dangerous rivers to obtain the services of a local guide. This was especially necessary in the present instance as the river, at the place where we crossed it, was twice as broad as the Thames at London Bridge, and full of dangerous quicksands; moreover, the ford was not in a direct line across the river, but lay in a series of zigzags, any departure from which, we were warned, would probably be fatal to us. To follow a long string of horses across such a ford as this, so as to keep accurately in the track of the guide, would, at first sight, seem to be almost impossible, but we were not long in discovering that the older and steadier packhorses, by some natural instinct, seemed to be well aware of their danger, and were careful to turn either to the right or left at the exact points where the guide had done so, and by following these we were enabled to keep pretty accurately on the proper track. I should mention that the difficulties in fording this river are greatly increased by the thick glacier water which entirely hides its bed, in addition to which the ford is continually changing its locality, and it seems wonderful how the guides are able to discover its new position.

After visiting Hekla we proceeded to Hagaey, where the guide across the Sprengisandr lives. As we had to wait for half-a-day at this place in order to get the ponies shod, &c., we took the opportunity of measuring the river Thjórsá, which we found to be 640 yards across. After leaving Hagaey we followed the Thjórsá to a point where it took a short turn to the east, while our route, after passing over a hill to the west, lay in a general northerly direction over sand and disintegrated lava. Previous to A.D. 1400 this is reputed to have been a fertile plain covered with woods and grass; in that year, however, an eruption of Baudukambar took place, and overwhelming the farms and fields reduced it to its present state of desolation. From this place our route turned eastward across the Sandfell till we again came in sight of the Thjórsá, at the point of junction of the Tungná, its chief affluent. In the evening we camped at Knappölduver, where for the first time we experienced one of the great inconveniences of Icelandic travelling, I mean the difficulty of procuring fuel. The only material available is the dead wood from scrub whortle-berries and birch, which is never thicker than a pencil, and burns with the greatest rapidity. We were many times

more than an hour before we could get enough wood to boil a kettle, and often thought of the sweet simplicity of the Geysir mode of cooking.

The next day's journey was over a complete desert, but did not possess any special feature of geographical interest. The camping-place for the night was on the right bank of the Thjórsá, at a small oasis named Sóleyjarhöfði. We here witnessed the great rapidity with which glacier or jökull rivers rise and fall. At this season of the year (the middle of August) the river can be crossed safely up to about noon, when the jökulls begin to melt, and send down a volume of water which renders them impassable till the next morning. The chief danger in crossing Icelandic rivers is caused by the quicksands which are continually changing their positions, and which would be immediately fatal to any one who was unfortunate enough to ride into one. This, at a later period, nearly happened to one of our party while allowing his horse to drink at what was to all appearance a wayside pond. Next day's ride brought us to Eyvindarkofaver, a place so remote from all the farms, that an outlaw named Eyvindr lived there unmolested for many years, until, indeed, his sheep-stealing propensities became intolerable, and an expedition resulting in his capture was made by the farmers who lived nearest to him.

We found all our guides extremely credulous with regard to the legends of the past. Many of the stories related to outlaws, and how it became necessary for them to invent some more rapid mode of locomotion than simply running, in order to evade their pursuers. This, in the case of Eyvindr, consisted in his running on his hands and feet, and turning what boys call cart-wheels; while in the case of another outlaw, Eyrikr of Eyriksjökull, after having had both his feet cut off, he made his escape by running on his hands alone.

From Eyvindarkofaver, next day, we made our start to cross the Sprengisandr, a track much dreaded by the Icelanders, and seldom traversed by any one. The guide whom we obtained at Hagaey is the only man who knows the route, which he has learnt in the pursuit of his business as a gatherer of Iceland moss (*Cetraria islandica*). The usual and better known Sprengisandr route lies at the foot of the magnificent Arnarfell, about 15 miles to the westward. As soon as we left our camping-ground we entered on the arid desert, and knew that we should not find food for the ponies for at least 10 hours. The track lies over undulating ground composed of sand and lava dust, varied at times by thickly strewn blocks of lava which wounded the legs and hoofs of our horses. The gloomy monotony of this desert is sometimes relieved by the beautiful shades of colour of small clusters of saxifrage which seem to flourish in portions of this inhospitable waste. At midday we halted on the west shore of a lake which extended for about seven miles in a northerly direction, its greatest breadth being about one mile. A very striking feature in many places along the route is, that on the top of the hills

there exist very large and dangerous quicksands, and it is mainly from this fact that so few persons ever cross it. In some places these quicksands extend over a space of several acres, and it is quite impossible to tell, except by practical experience, the position of the solid ground. This district, too, has a very sinister reputation on account of the fogs which at certain seasons often hang over it for days, and in the event of a traveller being overtaken by one of them, he would in all probability be starved to death. When about half-way across, a considerable breeze sprang up, and from the height to which the pumice dust rose, we could quite believe the statement that under certain conditions it would reach Norway or the Færoe Islands. These dust storms, in addition to the jog-trot of about five miles an hour, at which we usually rode, were very severe tests for the performance of the watches that we carried, and we soon found that an ordinary watch, even when of good quality, could not be depended on in the least. We had, however, with us one of the watches similar to those supplied by this Society to travellers, and this performed excellently the whole time, only varying from its regular rate $\frac{1}{2}$ second; this seems to be good evidence that an ordinary watch is not in the least suitable for rough usage on horseback when exposed to storms of fine dust, and also that the Society has found a pattern which will perform satisfactorily under the most severe tests.

The next object worthy of notice is the district round Mývatn; the whole of this part of the country is covered with the craters of extinct volcanoes, every hillock along the route bearing unmistakable signs of having been at some remote period in a state of activity. At present, however, they are all at rest, and have been so for many years.

After passing Reykjahlíð we came to the mud-springs of Hlíðarnámar, which present a most weird appearance. They are situated in a valley, the neighbouring hills being tinged in many places with yellow from the sulphur deposits, and from the sides of which issue columns of steam from numerous hot springs. The mud-wells themselves are circular holes in the ground, from one to 20 feet across, in which a vast quantity of pitch-black mud is in a continual state of ebullition. Several of the larger wells throw up the mud to the height of six or eight feet, and this falling on the surrounding ground, has gradually made a wall of the same height, in form somewhat resembling the Great Geysir in miniature. In other places the steam issues from small vents in the ground, and condensing round the orifice, makes a deposit of nearly pure sulphur. The whole ground for a considerable distance round these springs merely consists of a crust of sulphurous mud, the surface of which has solidified. Here again there is a considerable risk of being scalded by this crust giving way; indeed, each of us got in to a certain extent, but thanks to our long boots came to no harm. All around these springs there are vast beds of sulphur pierced with small holes,

through which the vapour escapes. In many places the crust, which presents the most beautiful efflorescence, is not more than an inch thick. These springs are, I believe, as rich, if not richer, in sulphur than any in Iceland, but the cost of transport to Húsavík or Akureyri, the ports of shipment, would consume all profit arising from working them.

After leaving these wells we rode on past Krafla and the obsidian hill, and on the way passed many smaller springs of boiling mud. About 700 feet below the summit of Krafla we came on a lake of the clearest water, which is now cold, but which at the time of the visit of Henderson, 1814, must have been a most remarkable sight. He describes it as a circular pool of black liquid matter about 300 feet in circumference, from the middle of which a vast column of black liquid was being thrown up to a height of about 20 to 30 feet, and equal in volume to the Great Geysir; these eruptions took place every five minutes, and lasted two and a half minutes. This place is now much frequented by reindeer, whose tracks we observed close to its shores.

Passing on we came to a hill, which, in the glittering rays of the sun, has the appearance of being composed of innumerable broken bottles; this was the celebrated Hrafninnuhryggur. The whole of the hill, which attains a height of about 200 feet, consists of obsidian in blocks of various sizes, and pieces could easily be obtained weighing more than one hundredweight. The greater part is intensely black, and has the appearance of jet, but some is of a dark brown colour. If any use for it could be found in the arts or sciences, this hill alone would afford an almost inexhaustible supply, the only difficulty being the usual one in Iceland, the means of transport.

We now turned to the south-east in order to visit the new lava. This is a stream of lava about 20 miles long and about four miles wide, as the guide informed us, which issued from Askja in 1875. It appears to have flowed in a direction nearly due N. and S., and terminated at a point about a quarter of a mile to the S. of the road between Reykjahlíð and Hof. We fixed the position of the northern point of the stream by the bearings of Haugr, Búrfell, Jörundur, Grimstaðr-naup and Hlíðarfjall, taken with a prismatic compass by Mr. Coles, and as these were particularly good marks for bearings, I think the position as indicated on the map may be taken to be very nearly correct. The dimensions of the stream we obtained from Jón of Reykjahlíð, who was a most intelligent man, and also seemed to understand the points of the compass, a rare thing among Icelanders, owing, probably, to the variation which I have mentioned before, and was probably as well acquainted with this portion of the country as any living man. This new lava can be seen as an inky black streak for many miles, and much resembles the slag from an iron furnace. It is a very curious feature that

the ground over which it flowed has been depressed more than 20 feet below the surrounding country, as if the weight of the superimposed lava had forced it down, and this depression is not only up to the point where the lava stream ends, but continues for a considerable distance beyond. The ground around is covered with ashes about the size of a walnut, and the scant herbage still bears evident indications of the intense heat given out by the molten lava; in fact, we heard that it was hot enough to ignite paper for a long time after the eruption had taken place.

After leaving the new lava we proceeded to Eilífr, with the intention of visiting Dettifoss, which is reported to be the finest waterfall in Europe, and then to return to Akureyri by way of Uxahver and Húsavík. When, however, we reached Eilífr a blinding snowstorm came on, and after waiting for thirty-six hours, as our time was limited, and our provisions had come to an end, we were obliged to make for Akureyri, and in doing so, after leaving Hals, we passed through the forest of the Fnjóskadalr. I have made use of the word forest in its Icelandic sense, as the dwarf birches of which it is composed in no case that came under my notice exceeded twelve feet in height, or the thickness of a man's arm.

Akureyri is the town of second importance in Iceland, and its name, which means corn country, would indicate that great climatic changes must have taken place since the early Norwegian settlers gave it that name. At present there is no sign whatever of the cultivation of any kind of grain; but, strange to say, in the neighbourhood of this northern town the cultivation of the potato is carried on to a great extent, and, as I was informed, with considerable success. The Icelandic Trading Company have at this place a trading and fishing station, which we visited, and which much reminded Mr. Coles of one of the Hudson's Bay Company's posts. In connection with this establishment there is a shark fishery, and a factory for refining the oil. The smell caused by this operation is most offensive. On making inquiry as to the use to which this shark oil was applied, we were informed that it made its appearance in the European market as cod-liver oil. I may also mention that it is here that the only tree in the whole of Iceland worthy of the name is to be found.

The route from Akureyri back to Reykjavík is comparatively well known, and does not possess any feature of great geographical interest. All along this journey we carried with us a six-inch transit theodolite, which the Council of this Society were so good as to lend us. When at Reykjavík an American gentleman who had crossed the island, assured us that it would be impossible to carry this instrument over the rough country we should have to traverse without doing it such damage as to render it entirely useless. We, however, felt sure that by taking proper precautions as to the manner of packing it, we should avoid the evil consequences which had befallen this gentleman in his attempt to take with him a smaller instrument of the same kind. We procured a box about three

inches larger each way than the theodolite case, and having first laid some old rags at the bottom, the instrument (in its case) was placed in this box, and firmly fixed in its position by pushing spare clothing or anything of that sort tightly round it; then having put another layer of clothes on the top, the lid was shut down and locked, and the box fastened to a pack-saddle in the same manner as in the case of an ordinary load. The result of this mode of packing was that the instrument never got out of adjustment to any appreciable extent. Whenever we used it we tested it by taking the angles of elevation with face right and left, to discover if the diaphragm had been moved, and always with satisfactory results. This instrument is now, Mr. Coles informs me, in the Society's observatory, in good adjustment, after having been carried across Iceland on a pony, the greater portion of the journey having, as I before mentioned, been made at a jog-trot. I have dwelt rather longer than I at first intended on this subject, as I have thought that it was one of great interest to travellers. We never experienced any trouble in unpacking the instrument, and a very few minutes sufficed to have it levelled and ready for use.

During our journey across the island we were much struck by the entire absence of any provision for warming the houses by artificial means. In one house only did we see a small stove. This is the more remarkable when we consider the Arctic severity of the winter in Iceland, the thermometer falling, as we were informed, to 25° below zero. The method adopted by the inhabitants of keeping themselves warm during the winter was pointed out to us at the farm Lúndarbrékka; here we saw under one roof a water-mill for grinding rye, a blacksmith's shop, and a small room in which they all assembled during the winter season, close to which was the cow-house; the walls, as is common in Icelandic farm-houses, were covered in with about six feet of turf; in the cold weather the doors are shut, and we were told that so far from suffering from cold the heat was oppressive; under these circumstances it is not difficult to imagine that such might well be the case, and I may also add we may with equal ease imagine the state of the atmosphere. The only employment that the Icelander finds to occupy his time in the winter is tending the sheep, which are all housed in buildings in the form of a T, composed of turf, with the smallest possible doors, and minute breathing holes in the roof. The sheep themselves are folded in the stem of the T, while the hay on which they are fed is stored in the cross-arms. The hay itself is often collected from spots many miles distant from the homestead, and gives the people full employment during the whole of the summer months; the horses, except in the case of the more valuable animals, are allowed to shift for themselves; the journeys that these badly-fed and ill-cared-for little animals will make over tracks which would be impassable to the horses of any other country, are truly wonderful.

I have purposely omitted any mention of Askja, as, on leaving Lundarbrekka, Mr. Coles and myself proceeded to Gautlönd, while Mr. Delmar Morgan engaged a local guide and explored this celebrated mountain. Being one of the very few Englishmen who have ever visited it, any remarks he may have to make on the subject will, I am convinced, be of great geographical interest to those present this evening.

With regard to the meteorology of Iceland, I may mention that our temperature observations varied from 80° F. in the sun to 26° F. at night. We experienced two severe snowstorms, but with those exceptions, the weather was magnificent. The displays of the aurora borealis, too, were of the most brilliant kind. At the end of August the Arctic ice was close to North Cape, and Captain Kihl, of the mail-steamer *Valdemar*, informed me that the passage round the north of the island had never during the year 1881 been entirely free from ice. On our return to Reykjavik we found that the trade in ponies and sheep was at its height, large numbers being shipped every week. Indeed, we were informed that over 2000 sheep and 750 ponies reached Leith during the first fortnight in September.

In concluding, I should like to say a few words about the Icelanders. Before our arrival we had been led to expect to meet with an indolent dirty race, whose chief object would be to obtain as much money for as little work as possible, and who would spend all they earned in drink. I am glad to say we soon found we had formed a most erroneous opinion of the people. I think one might search the world over without finding three better guides than those we engaged. Cases of extortion were extremely rare, and we only saw one man at all the worse for liquor. The great majority of the farm-houses were very clean, and no matter what time we arrived, whether the farmer had gone to bed or not, all did their utmost to make us comfortable, charging most moderately for our board and lodging.

Excursion to Askja, August 1881. By E. DELMAR MORGAN.

(Read at the Evening Meeting, January 30th, 1882.)

I started the 20th August on a snowy morning for Askja, having left my companions, as mentioned by Mr. Peek in the foregoing paper, at Lundarbrekka. The storm of the previous day had not subsided, and the air was so thick with falling snow that no landmarks, not even the nearest hills, were visible. It seemed almost foolhardy to set out in such weather to cross a trackless lava desert of great extent. I possessed a compass, certainly, but though this would give the approximate direction of the mountain I was about to visit, still as it

might be affected by local influences it could be of no further use. My guide, however, the celebrated Jón of Vidrkær, showed no signs of fear, and as it was impossible to communicate my doubts to him in Icelandic, I determined to put the best face on the matter, so enveloping myself in an oilskin coat, I mounted my grey steed, and we trotted off amid the farewells of Jón's family who had assembled to see us start. We had four ponies, one carried a light bell-tent, our provisions and a few wraps, another bore two sacks of hay stuffed as tight as they could hold, whilst we rode the two others. But let me say a few words about my guide. Jón of Vidrkær is a respected name in Northern Iceland ever since the terrible eruption of Askja in 1875 alarmed the whole island. He was the first to organise a party to proceed thither and report upon the state of the volcano which was spreading terror on all sides and threatening to destroy every trace of culture and cultivation in the surrounding country. He animated the despairing people and led them across the desert to the scene of desolation, and it was in consequence of his representations that the Danish Government decided to send a scientific expedition under Professor Johnstrup whose report of the eruption was afterwards published in Denmark.

Dýngjufjöll, or "the mountain of the bower," is the name given to a group of hills rising up in the centre of the lava desert of Mývatns. Örafi, half-way between Mývatn lake and Vatna Jökull. Enclosed in the centre of this group is Askja, or Basket, so named from its shape. Here, in 1875, the terrific eruption took place; flames* burst from the summit, accompanied by showers of ashes and pumice sand, whilst from an opening in the desert below, a prodigious flood of lava poured forth, moving steadily along, a red-hot mass of molten rock.

The rocky sides of Askja vary in height. On the north-east, near Jón's Pass, I found them to be about 500 feet above the floor, if it may be so termed, of the basket; on the east and west, where it widens, they are low, and have allowed the lava to overflow; whilst on the south, near the new craters, they rise precipitously to a height of over 1000 feet, margining one side of a large lake, about a Danish mile in circumference. It is here, at the southern end, that the chief interest concentrates. The new craters, of which there are several, are all in a state of semi-activity, throwing up hot water and steam to a great height and making a tremendous noise.

Askja, from its isolated position far removed from beaten tracks, its inaccessibility and barren nature, has been but little visited. Besides the Danish savant Johnstrup with Lieutenant Caroc, who drew a survey of it, only two Englishmen have been there besides myself: Mr. Watts, who made his way thither across the ice-bound wastes of Vatna Jökull, and

* It is a popular fallacy to suppose that flames ever appear at the summit of a volcano. Professor Judd says that the appearance of flames is caused by the reflection in the smoke of burning matter inside the crater.

Mr. W. G. Lock,* whose acquaintance I afterwards made, and with whom I had the opportunity of comparing notes. No other persons had, as far as I am aware, visited this volcano, though there are probably few places so well worth seeing.

We started, as I have said, early in the morning, Jón leading, followed by the packhorse, whilst I brought up the rear; the pony with the hay preferring an independent course, had to be continually brought back to the track. About an hour's ride brought us to Svartákot, a small farm and mill, on a lake owned by the man who piloted Mr. Lock to Askja on the two occasions he visited it. The weather began to show signs of mending, and though still very foggy there was no actual snow-fall, and hay-makers were returning to their work. We left Svartákot and rode along the right bank of the Svartá, flowing between flat banks, with an occasional expanse of grass-land. We startled some wild duck on its waters but saw no other birds, though willow grouse or "rjupa" are also found here. About an hour and a half brought us to the sources of the Svartá, curious circular pools where the stream issues from beneath the overlying strata of lava, forming miniature whirlpools. Its true source is probably many miles away, in Dýngjufjöll, where, like its namesake, tributary of the Jokulsá, it may also disappear below ground, a not uncommon occurrence in this country. From these so-called sources of the Svartá, marked by a cairn, we took a south-east direction across the barren lava desert of the Mývatns Örafi. The snowstorm of which I had been complaining now served us a good turn, for it had filled many of the interstices in the rough lava and gave a secure foothold for our horses. The further we advanced the more barren it became, till vegetation dwindled to an occasional tuft of tall wild oats, how sown it would be difficult to say.

Some unerring instinct seemed to guide Jón in these solitudes, for at the end of four hours' steady riding we came to an outlying bluff or eminence standing at the foot of some high land. Here we rested a few minutes, then taking fresh bearings, turned our ponies up the ascent. Snow lay nearly a foot deep on the slopes, and the higher we went the deeper it became. Now and then the sun showed a yellow disc for an instant through the haze, but this glimpse was of great assistance, and Jón kept continually looking up as though he had doubts of our being in the right direction. Half-an-hour from the commencement of the steeper ascent we crossed a brook where we filled our bottle with the delicious clear water, as this was the last we should find. Then the incline became steeper and more difficult as, dismounting from our ponies, we led them over the snow and ice. After about two hours of tedious progress we stumbled into Askja, having missed the pass, just as daylight began to wane. Stopping for a few minutes at the foot of some high cliffs, we heard distinctly the distant roar from the craters

* Vide Mr. Lock's paper on Askja, 'Proceedings,' 1881, p. 471, and letter, *ibid.* p. 741.

situated at the southernmost extremity. Picking our way along the side of the old lava bed, we halted near the foot of the pass, known as "Jón's Skard," in honour of my guide, by which we should have entered, and selecting a smooth place for our tent, we prepared to pass the night on the snow. The weather had by this time become settled and there was every prospect of a fine day for the morrow. I started immediately for the craters which I could see smoking away in the distance, never thinking of the difficulty of getting there and back before nightfall, and had gone about a mile when Jón overtook me, and gave me to understand that it would be the height of folly to risk the attempt.

I have been in many lonely places in my life, the great pine forests of Northern Russia, the immense plains of Central Asia, the watery wastes of the Atlantic, the arid deserts of Persia, but none to equal the desolation and absolute lifelessness of that scene at Askja. Imagine a huge amphitheatre, $4\frac{1}{2}$ miles long by about three wide, filled with lava-rocks of former eruptions, piled up in extraordinary confusion and assuming all kinds of weird and curious shapes, here rising in jagged crests, 10 or 20 feet high, there rent asunder by deep cracks, and surrounded on all sides by a girdle of rocks; not a blade of grass, not a living creature of any kind, a picture of desolation, bringing to mind the unseen, pent-up powers of nature, lava inside and lava out, nothing but lava, centuries, some of it thousands of years old.

Deeply impressed with my first sight of Askja, I lay down to rest, but such was the cold (9° of frost inside the tent at 4 A.M. on the 21st August) and the novelty of the surrounding scene that I courted slumber in vain. With the first streaks of dawn we were again on foot. Jón started off in search of the horses, these animals though tightly hobbled having contrived to decamp in the night, leaving us without the means of escape from our isolated position, and it was fully an hour before he returned with them. During his absence I boiled some tea for our breakfast over a spirit-lamp, a process trying to the patience, for what with melting the snow and then boiling sufficient water to brew enough tea for two cold, hungry men over a small flame, much time was expended.

We now took the extra precaution of tying the ponies in pairs, head to tail and tail to head, and having observed for altitude by boiling water in the apparatus supplied by the Geographical Society, I and my guide started to walk the long Danish mile that separated us from the craters. Fortunately the snowfall of the preceding day again befriended us, by rendering the walking much less difficult than it otherwise would have been, and instead of four hours—the time it took Mr. Lock—we reached the pumice crater exactly in two, and had nowhere to go upon all fours in the manner he describes, but walked the whole way. Herdubreid, the "broad-shouldered mountain," stood out distinct and

beautiful against a cloudless sky, its snow-capped summit glowing in "the roseate hues of early dawn." It bore E.S.E. by the compass, which allowing for magnetic variation would be almost true E.N.E. of Askja.*

Without stopping anywhere for long we reached the pumice crater at a quarter to eight, after crossing more recently erupted lava, black in colour, and less uneven than that we had hitherto seen. From the north side the crater is easily approached. Standing on its edge I looked into an abyss apparently from 200 to 300 feet deep, with a diameter of about 50 yards near the mouth, contracting to less than half that size at the bottom. On the west the cone falls abruptly 500 feet to the lake. Here the edge of the crater is so narrow as barely to allow standing room, and we had to lie down with our bodies inclined at an angle of 45° outside, and our heads looking over the wall. Hardly had we taken this position, than with a loud roar a jet of mingled water and steam was thrown up to a great height, subsiding just as suddenly as it began. This proceeded apparently from a new outlet and not from a circular pool alongside, which was boiling and bubbling furiously. The quantity of pumice here is enormous, the cone itself is entirely composed of pumice sand, and this extends to the shore of the lake and beyond it up the gorge in which the other new craters are situated. The descent was easy down the steep slippery side of the cone, covered with a thin coating of snow, to the lake. This is a sheet of water from three to four miles in circumference, judging by the eye. Its depth is stated to be 300 feet in the centre, and even round the sides no bottom could be seen though the water was of transparent clearness. The surface was perfectly calm and mirrored the high, snow-covered cliffs on the opposite shore, whilst bits of pumice floated here and there, and a fringe of steam issued from the sides.

I found the temperature of the water nearly the same as that of the air, both being about 54° Fahr.† As to there being a subterranean connection between the lake and the craters, I could not even hazard a conjecture on this point, but the comparative coolness of the water, at all events round the edge, leads me to infer that no such connection exists. Jón declared that there was much more water in the lake than

* I may mention that we met an American of the name of Howorth at Reykjavík, who said he had ascended Herðubreið, but the local guide denied that any one had ever climbed to its summit, which he said was a sheer precipice quite inaccessible. The *New York Tribune* described Mr. Howorth's ascent of this mountain as having been effected by means of ropes and anchors, kites having been used to lift the anchors to the summit. The explorer, moreover, is said to have been accompanied by 50 men; it would be impossible to feed such a number in these uninhabited, outlying parts of Iceland, and there is certainly not enough grass for the transport animals necessary to carry supplies for so large a party.

† Professor Johnstrup found the temperature of the water to be 104° Fahr., and Mr. Lock tested it in 1878 and found it to be 97° Fahr. See *Proc. R. G. S.*, vol. iii. (1881) p. 477.

when he last saw it, a fact no doubt attributable to its receiving the drainage of the surrounding basin, whilst on the other hand but little is returned to the atmosphere by evaporation. The water was pleasant to the taste and had no deposit.

Having boiled my thermometer to ascertain the height and taken a reading of the aneroid, I followed the guide to a narrow chasm or dry gully, by which water ejected from the upper craters must formerly have flowed into the lake. This appeared at first sight to be an insuperable obstacle to farther progress, but on closer investigation a crack was found in the hard clayey surface-crust leading straight to the bottom. By crawling down it I was able to descend, but the ground felt quite warm, and hot steam issuing from the sides reminded me of a Russian bath. Jón shot rapidly down as if he were on an ice-hill, landing on his feet at the bottom where he was ready to give me a foot up the almost perpendicular opposite bank. It was curious to find oneself, 4000 feet above sea-level, near the Arctic circle, and surrounded by snow and ice, in so warm a spot, with more risk of being boiled than frozen; but Iceland is full of these strange anomalies, which make it unlike any other country. From the lowest depths of the craters upwards to the highest ledges of the lofty cliffs, steam was escaping in jets of all sizes, from the tiny thin stream, no bigger than the smoke from a tobacco-pipe, to the monster valves bursting open every now and then with a loud roar, as when a big steamer lets off steam at the end of her voyage—a marvellous scene, and one never to be forgotten. The surface-crust was in places red, green, and saffron-coloured.

A few pieces of obsidian, quartz, and asbestos were scattered about, but the obsidian, formerly plentiful here, has disappeared beneath the pumice-sand into which its weight has caused it to subside. After crossing the gully or dry ravine, already mentioned, we walked up a steep incline to the craters. The first of these was of considerable depth and full of steam. Whenever this cleared away for a moment I could see water below agitated in small waves. The second crater, still higher up the gorge, was also ejecting large quantities of steam with a deafening noise.

On its brink a cairn had been erected by Jón Thorkelsson, my guide, to record his first visit in 1875. The stick on which he had cut his initials, and which he had placed under a stone, had decayed, for on taking it out it fell in two. This marks the furthest point hitherto reached in Askja; what lies beyond will be for future explorers to determine.

Satisfied with what I had seen I turned back and retraced my way to camp. To relate the incidents of the return would be to occupy too much time, suffice it therefore to say that the same difficulties had to be overcome with energies somewhat exhausted. I was favoured, however, with magnificent weather, and as the sun shone out with great brilliancy,

lighting up the weird scene, obstacles appeared to vanish. Far different would have been the aspect of the place in the storm which had been raging with great violence up to my arrival. But whether in storm or sunshine, the traveller to Iceland should not omit a visit to Askja, and he could not do better than leave the necessary arrangements to Jón of Vidrkær.

OBSERVATIONS FOR ALTITUDE TAKEN BY MR. E. D. MORGAN.

		Barometer.	Thermometer, Fahrenheit.	Deducted height in feet.
August 20, time 6 A.M.	Vidrkær farm ..	28·5 inches.	35°·5	1929
" " 7 P.M.	{ Askja, at foot of } { Jón's Pass .. }	25·6	33°	3835

Observations with Boiling-point Thermometer.

		Boiling point.	Reading of Barometer.	
August 20	Askja *	204°·1	25·6 inches.	4161 feet.
" 21	Lake at Askja ..	205°	27 "	3574 "

The CHAIRMAN (Sir Rutherford Alcock), in introducing the author of the first paper, said that Mr. Peek was one of the most promising pupils of Mr. Coles, the instructor in astronomical observation and surveying, under the system established by the Council two years ago for the scientific training of travellers. He went to Iceland, as a promising field in which to test the value of the instruction he had received. So enthusiastic an observer, and one who had been so trained, would be sure to add something to our accurate knowledge of the geography of that island.

After the above papers—

The CHAIRMAN said it was difficult to conceive any region of greater interest than Iceland as regards physical geography and geology. Mr. W. G. Lock, who had made several visits to the island, was present, and perhaps he would make a few observations to throw some light on such a strange region, which, while its surface was covered with snow, cast out alternately boiling lava and boiling water from the depths below.

Mr. Lock said that he was the first Englishman to visit Askja after Mr. Wm. Lord Watts,† and he would like to say a few words, not only descriptive of the eruption in 1875, but also of the important part that that volcano had undoubtedly played in the construction of the island. On the 4th January in that year a terrible explosion took place somewhere in the interior, but where was not known at the time, causing an earthquake that was felt over the whole island. Fire, smoke, and steam were seen ascending from Askja, immediately after, and four days

* The height of Askja, taking the mean of the two sets of observations, would be nearly 4000 feet.

In kindly computing these heights for me, Mr. Coles has referred to Admiral Irmingier's tables of barometrical observations, taken on the same day at sea-level, on the west coast of Iceland, in about the same latitude as Askja.

† Mr. Watts read a paper before the Society on the subject. See 'Proceedings,' vol. xx. No. 1, pp. 21-32, and the paper "Journey across the Vatna Jökull," with map, in the 'Journal,' vol. xlv. p. 1.

later, according to a letter written by a resident in the capital, quite a hundred miles distant from the volcano, a column of fire was seen ascending from the centre of the island, so high and brilliant that it seemed as if some neighbouring farm with its haystacks was burning. The fire shot up like lightning. When daylight dawned, a heavy column of vapour or steam was observed far in the background beyond all the mountains visible. Morning and night this grand display continued and was visible during the 9th, 10th, 11th, and 12th of the month. In February the eruption became less violent, and Mr. Delmar Morgan's guide, Jón of Vidrkær, ventured to cross the great central lava desert, in the coldest month of the year, to see where the eruption had taken place. It was then discovered that it had taken place in Askja, and that a vast mass of the lava deposits in that crater, five miles in circumference, had been newly torn from its bed and sunk in an abyss in the bowels of the mountain to the depth of over 700 feet. There was every reason to believe that this was caused by the explosion on the 4th January. The site of the subsidence was now the bed of the hot-water lake which Mr. Delmar Morgan had alluded to. In a desert region in the north-east, known as the Mývatns Örafi, an enormous rift opened, commencing at a spot distant 30 miles from the subsidence in the Askja crater, and from that rift lava continued to well forth for nearly four months after the explosion. It was first seen issuing there on the 27th of February by Jón of Reykjahlid, the farm nearest to the eruption, who, very naturally, went out to see what was taking place. This was the lava bed whose northernmost point was ascertained by Mr. Peek. In a paper published in the August number of the Society's 'Proceedings,' he (Mr. Lock) had stated very positively that there could be no doubt but that the lava flood came from Askja by a subterranean channel, and he wished to give his reasons for that view. During the whole of the time the lava was flowing forth in the Mývatns Örafi, smoke and steam were seen issuing from Askja, and, prior to the outburst of lava being discovered, explosion after explosion took place with great violence and frequency. It is believed that no lava was erupted from Askja itself, but the quantity of pumice and ashes ejected was prodigious, and proportionate to the magnitude of the lava flood that issued in the Örafi, where only an infinitesimal quantity of pumice and ashes was thrown out. In his opinion these facts afforded almost irrefragable proof that the lava came from Askja, for pumice is asserted by mineralogists to be the scum which forms on the surface of molten lava. The vertical cliffs surrounding the lake where the subsidence took place, showed a vast number of beds of basaltic and doleritic lavas underlying the present floor of the Askja crater. The presence of these was conclusive evidence that Askja was at one time a deep cauldron-shaped hollow, which had been filled up to its present level by the lava floods that had been deposited therein in the course of ages. It was only reasonable to believe that in time these vast deposits would entirely block up the vent or vents whence the lava issued, so that in 1875 it required less force to upheave, at a lower level by some 2400 feet, the rocky roof of a channel running under the Örafi, connected with Askja, than to force a vent through the lava deposits in that crater. Judging by what occurred at both places, it was probable that the force required to burst asunder the strata forming the roof of the channel in the Örafi, and that necessary to force an outlet in the crater were nearly equal. Naturally, vents having been formed in two places, the heavier molten matter would flow from that at the lower level, while the steam and gases would make their escape with pumice and ashes from those at the greater altitude. The latter, moreover, would act as safety valves, and the lava, not being subjected to any great pressure from confined steam or gases, by its own gravity would well gently forth instead of

being hurled far and wide, as most certainly would have happened if the safety valves in Askja had not existed. Professor Geikie some time back published a paper in *Nature* in which he said that it was his belief that the Faroes and some parts of Iceland consisted of remnants of an old tertiary formation, the basaltic plateaux of Northern Europe, which, prior to the disturbances of the glacial epoch, stretched far into the Arctic Sea. It was believed that during the glacial epoch upheavals and subsidences to the extent of 1800 or 2000 feet took place. It was his own opinion that immediately after those disturbances a scatter of islets were left on the site of Iceland, and that these had been united together by vast floods of molten rock issuing from some volcanic outlet or outlets in the midst of them. A rift in the earth's crust undoubtedly extended from south to north under those portions of the island known as the Vatna Jökull and Odáðabraun, as far north as Krafla, and was clearly traceable at the present day by a range of volcanoes. These show signs of active volcanicity at several places, in the form of extensive solfataras; and in the years A.D. 1724, 1725, 1727, 1728, and 1729, no less than five of the volcanoes, on the line of this rift, were active at one time, or immediately after each other; and the phenomena of the eruptions were such as to afford almost irrefragable proof of the connection of the volcanoes with each other. Askja stands in the centre of the range, and probably marks the widest portion of the rift, and must be considered the focus of volcanic activity in Iceland. Mainly from this rift, in his opinion, issued the vast sheets of igneous rock that united the scatter of islets, left standing at the close of the tertiary period, into one island—the Iceland of to-day.

The CHAIRMAN, in concluding the discussion, said that Mr. Lock had given them some interesting suggestions regarding the geological formation of Iceland: but the impression left on his (the Chairman's) mind was that its foundations were very unstable. The inhabitants of the island were to him a more interesting subject of study than the geology. They were the most contented race on the face of the earth, apparently. Although they lived over what may be called a great cauldron, they were perfectly happy. There was nothing particularly attractive in the appearance of the soil, and yet they seldom wanted to emigrate. In this the 70,000 inhabitants showed upon the whole a great deal of wisdom, for they might possibly go much further and fare worse. He understood from Mr. Peek that it was almost an unknown thing for them ever to travel out of the island, and they knew nothing beyond it except what steamers occasionally brought them in the way of information and news. The Society might congratulate itself on the good work it was accomplishing by its system of instruction and in finding a gentleman who would devote a whole year to such training and then go to Iceland to test his ability in making scientific observations. Mr. Delmar Morgan too had shown no small enthusiasm and had also given them much additional information.

*A Journey into the Nguru Country from Mamboia,
East Central Africa. By J. T. LAST.*

Map, p. 192.

I HAVE just returned from a little journey into Nguru, and send you a short account of it, thinking you may find it interesting.

We started from Mamboia on the 11th of October (1881), our party consisting of Mrs. Last, myself, two native women, and 19 men and boys. After stopping for a short time at the Sultan's village to wish him good-

bye, we descended the mountain on which our station* is situated, into the great plain which divides this district from Nguru. We halted for a short rest at Bwagamoya, and then went on to a collection of some six or eight villages forming the principal part of a small district called Mguru. Here the chief kindly invited us to his village. Accordingly we pitched our tent, and enjoyed some much needed repose, the chief, who visited us in the course of the day, giving us information about the road, pointing out two ways by which we could go. The natives of the place are Wakaguru; but some few Wazeguha have settled down with them. The land is good, but they cultivate little, living, as they do, in continual dread of the predatory Wahumba and Masai, who at any time may come and turn them out of their homesteads. The next morning we were up early, and started at 5.30 A.M., hoping to reach Sabundila at night. We first went on to two deserted villages, called Ma Mbaya. Here we rested, had breakfast, filled the calabashes with water (for we were told there was none to be had on the road), and then started again. These two villages had been attacked last year by a chief, living some few miles off, called Milanda; many people were killed and the rest fled to the mountains. This chief, Milanda, died early this year, to the great joy of many living around. From Ma Mbaya we went on till 2 P.M., then rested. After a short time we resumed our journey, and went on till 4 o'clock, when the guide telling us that we should not be able to reach the village the same day, we resolved to camp out where we were. Some of the men were sent for water while the rest built up a grass hut for our use, and formed a fence round the camp with branches, as a protection against a probable nocturnal visit from feline animals. Footprints and signs of rhinoceros and hyenas were to be seen all around, and on the march we had seen a fine herd of zebra.

Oct. 13th.—We were up early, and started for Sabundila. After about two hours' travelling, we came to a place where some Wakamba had been hunting, close by which there was plenty of running water. Here we stayed and had breakfast. The country passed through had formerly been inhabited, as one could see by the grinding-stones lying about, though it must have been deserted for many years, as there was not a vestige of a hut visible. The land is of a good light soil, well adapted to native agriculture. Further on we passed through a splendid valley, which had formerly been a garden, but was now abandoned. Probably any amount of water could be got by digging a few feet. Leaving this valley we entered another, and soon came to the gardens surrounding the village of Sabundila. The people were afraid of us at first, thinking we had come to fight them, but after a short interval, finding that our intentions were peaceful, they laid aside their fear, and came to talk with us. The chief then told me that the Wakamba hunters had recently attacked him, and when he saw us he thought we were about to do the same.

* Mamboia is a station, recently established, of the Church Missionary Society.

We were soon, however, on very friendly terms, and he brought me a present of sugar-cane and a good goat, for which I gave him a suitable return present. Mrs. Last, by showing pictures and talking, soon gained the confidence of the women and children. The friendly disposition of the people (Wanguru and Wakaguru) induced us to prolong our stay here for another day; but the place is very poor, much cattle having been carried off by the Wakamba and Wahumba, and little land cultivated through fear of these raiders.

On the 15th October we started again. We made a short journey to Babala. Here we camped outside the village, in order to be a little more apart from the noise and inquisitiveness of the natives. The old man who is chief was very kind in his way. He brought us a small goat (of course hoping to get a much larger present in return) pleading poverty as a reason for not bringing a larger one. Both the chief and his wife remained with us in the tent for a long time, talking. We rested here the next day and had many visitors, with whom Mrs. Last soon became a special favourite, by her showing her pictures and talking to them. The chief and his wife came again to-day, and stayed some time. In the evening some six Wahumba paid us a visit. They very readily took and ate some biscuits we gave them, showing a degree of trustfulness far surpassing that of the ordinary natives. I had some talk with them through the medium of one of my men, who know their language. Here there is a running stream of good water, on each side of which the natives cultivate their gardens.

Monday, 17th.—We resumed our journey this morning, about 6 A.M. The Wahumba and a number of the inhabitants of the place came to see us off. I gave to the chief and his wife three cloths as a present, in return for their kindness. We had a rather long march, across a plain separating Babala from the district of Kiseru. About 2 P.M. we reached the banks of the Luseru river. All the villages on the south side had lately been attacked by the Masai, and the people driven to the mountains. We had to cross over to the north side, where there are several villages. The river was very low, the water being about a foot in depth and some 30 yards wide. We were well received by the natives, who invited us to one of their villages, an invitation which we gladly accepted. The people here (Wanguru) had a far better appearance than any natives we had hitherto met; their manner also was a little more civilised. This is accounted for by Kiseru being on the main road from the Masai country to the coast at Saadani. These Wanguru are continually going to and fro between here and the coast, and so get accustomed to the semi-civilised ways of Zanzibar.

The valley of the Luseru is very beautiful, having magnificent tall trees on either side of the river, and large tracts of good land suitable for native cultivation. The people build after the Kizeguha style. They clear some three or four acres in the middle of a very thick forest,

and then build their *misongi* (round huts). When all are built they surround the clearing with a fence of young trees about 12 to 14 feet long, placed close together. The entrance to the village is by a narrow path cut through the forest about 250 yards in length, which is fortified by three or four strongly barricaded doors, at suitable intervals. These are always fastened at night, thus preserving the inmates of the village from attack both of men and wild beasts. A species of *Euphorbia* is often planted round the villages, forming a hedge which few people would dare to break through. We stayed here all Monday and Tuesday. The people continued very friendly, and the chief brought me a good sheep, which I killed, giving part of it to my men. Mrs. Last as well as myself had to explain our objects in visiting them to large audiences. What surprised them and induced them to listen to us the more attentively was the fact that we did not trade in anything.

On Wednesday, October 19th, we started again. First, we went to Sagasa. The journey was through a country which had been formerly cultivated, but was now deserted. All along the banks of the Luseru, by which we travelled, there was plenty of good land. At Sagasa we rested for a short time. Whilst there a party of some twenty women came down from their villages to fetch water, under the escort of six men, who were supposed to guard them from the Masai reported to be in the district. After some talk with them we continued our journey towards Banda, walking most of the way up the valley of the Luiji. This river flows from the extreme north of Nguru down into the Luseru, and thence to the Wami. Both sides of the Luiji valley are thickly populated, there is, in fact, one long string of villages from Sagasa to Mgera, in the north of Nguru. There is a fair amount of land cultivated, chiefly Indian corn; but sugar-cane and bananas also abound. The people living in the valley are chiefly Wanguru, here and there a village of Wahumba being met with. On the tops of the very high mountains in this district are the gardens and villages of the Washambala. These people were probably the original possessors of the country, since driven up into the mountains by the Wanguru, who look upon them as much inferior to themselves. We were well received at Banda, all the women and children coming out to greet Mrs. Last, whom they saluted as their friend and mistress. We had much company, all the natives wanting to see the pictures, and also to express their opinion on what we said. Here, as well as at the other places we had visited, we were urgently requested to stay for a time; but this we could not do.

On Thursday, the 20th, we continued our journey up the valley of the Luiji, reaching, a little before noon, the village of Muwanga. Here we had an extra hearty welcome, for the chief of the village was the brother of our guide, and as they had not met for some three or four years, there was much rejoicing and gun-firing. We encamped on a nice clear spot near the village, and after a little rest had a number of

visitors, who were anxious to hear the news of the Wazungu (Europeans). In the evening one of the Wahumba brought us some fresh milk. It was so good, and the calabash in which he brought it was so clean, that I gave him two yards of cloth for his kindness. This pleased him very much, and he at once fired off his gun as a sign of his satisfaction. He then arranged the cloth flowing from his shoulder cloak-wise, and rushed off up the mountain for a long distance, showing off the leaps and darts of the Wahumba warriors when fighting. We stayed here all the next day, during which we had many visitors. A large number of Wahumba came to see us, and the chief made us a present of a fine goat. In the evening we went over to the Wahumba village, where we saw and talked with several people. After a while the Mhumba who had brought us the delicious milk, came home from a village where some of his friends were living. He was pleased to see us, and at once went into his hut, and brought us more milk. He came again the next morning, and I gave him a good cloth in return for his kindness, and also because he promised to take my message to his Wahumba brethren.

The next morning, Saturday, October 22nd, we were up early, gave a present to the chief, and bid farewell to Muwanga. Our path still lay up the valley of the Luiji. It was rather rough, for instead of following the banks of the river, it passed over the ends of the spurs which extend from the sides of the great ranges of mountains down to the water's edge. Some of these spurs are 400 or 500 feet high. We trudged for several miles over the hills; coming at length to a large village where the paths branch off, the main road going up to Mabgwa and Mgera, another going up the side of a very high hill to Mgola's village. We took this latter road, and in about two hours reached the village quite tired, and glad to get both rest and refreshment. Mrs. Last was very tired this journey; she had come along very bravely, for the path being so rough she had been able to ride her donkey but a very little way during the day.

We camped outside, but as a high wind arose in the evening we shifted into the village, where it was more sheltered and warmer. The next day, being Sunday, we stayed here. In the morning Mrs. Last and I went out for a little walk to see the villages and people. Coming to a place in the course of our ramble where the paths branch off, we saw at the junction two clay images of men about a foot high, in front of which were two little *vinu* or mortars, models of those used by natives in pounding corn. On asking about them I was told they were the guardians of the road, and that no beasts, or men having bad intentions, could pass by them. This is the second instance in which I have seen such images used. The other case is where figures of men and women cut out of wood are fixed on the top of the roof of the round native huts; several of which I have seen

in the villages at Nagubika and Mamboia. I do not think there is the least worship or adoration paid to them. One at Mamboia is adorned with beads, and has a large pipe put into its mouth. The Mhumba who was friendly with us at Muwanga, followed us to this place, Mgola, as a mark of honour. On Sunday morning he came to the tent, and placing his powder-flask, belt, and gun, by the side of Mrs. Last, asked her to take care of them, as he wanted to visit his friends. This showed his confidence in us, for he knew that if he had done such a thing with a strange native it would be a great chance whether he would get them back again. On his return in the evening, I gave him a little gunpowder to use, if necessary, on his return home.

On Monday, October 24th, we started for Panghai and Tangelata. The first part of our journey was very bad. We had to ascend the very high mountain, and then descend into the valley beneath. Soon after we started it came on to rain, which made the path very slippery. After an hour's very hard work we reached the top, in the midst of a Scotch mist. Though we were hot and tired we dared not rest for fear of getting a chill, so we slowly descended, slipping rather than walking down the other side. When about 400 feet from the top we came to a beautiful little lake. Here many birds had built their nests suspended from the branches of the trees overhanging the water. Had the weather been fine, we should have thought it a charming piece of scenery.

In a short time the mist cleared off, and we came to some native gardens, where we rested a few minutes, and then went down into the valley. The whole of the top, and the slopes for some distance on either side of the mountain, were covered with magnificent timber trees, besides beautiful shrubs, ferns, and flowers of many kinds. A botanist would have revelled amidst this varied and beautiful vegetation in a region which is still virgin ground to the naturalist. Reaching the valley we crossed a stream about 10 yards wide, and then rested for half an hour near some villages. This district is called Panghai, the people being all Wanguru. They are well dressed, and ape, as far as they are able, the manners of the Zanzibar freedmen. Having rested we moved on again, and a little before noon reached Tangelata. Here we set up our tent outside the village. We had not been long encamped before a man called Bwana Hamadi arrived. As soon as possible we admitted him to our tents. He was followed by an Mbarawa, who acted as his right-hand man. Bwana Hamadi was formerly a slave of Seyed Majid, of Zanzibar; when the Seyed died, Hamadi managed to return home; here he became a great man, and is now the chief of Tangelata. This chieftainship he has obtained chiefly by oppression and robbery; having a few followers, wherever he saw a good chance of success he would attack a weak village, take as many of the inhabitants as he dared to sell as slaves, and put the rest under his rule. He has now a large district, and his brother has the

neighbouring one of Mgombezi. These men were very polite in their manner, but as soon as I had occasion to go out to see one of my men, they began to beg whatever they saw, knives, spoons, cups, and all similar articles. I soon discovered that we had fallen into not very good company, and resolved to get out of it again as quickly as possible. When they left in the evening, I told them I should start in the morning; they said no, I had not permission, but to this I simply replied that I must go. Probably they thought that their declaring I had not permission would be sufficient to keep me. We went to bed early; during the night a lion visited the camp, but he slunk off when he saw the men moving about. Very early the next morning I had everything packed and the tent struck, so that just at daybreak we were ready to start. I then sent off all the loads, and whilst one man was despatched with a little present to Bwana Hamadi, I started with Mrs. Last for Diwala. Hamadi, we learnt, was surprised at our departure, but I was very thankful that I had thus got clear of him, for as he has rather a large following of men, and is not under the eye of Zanzibar rule, he could have made himself rather troublesome had he tried.

The journey next day, October 25th, was in some places very rough, our way leading over many hills which jutted out from the sides of the mountains. On one of these hills there was a large village of Wahumba, which these people in all probability had taken from the Wanguru, and appropriated to their own use. The Wahumba women brought us some very good milk, in return for which Mrs. Last gave the children some pice (a Zanzibar coin rather smaller than a halfpenny). Resting a short time, we then went on to Diwala. Here we camped in a valley, a short distance from the river Rukagura. In the afternoon some women from another village of Wahumba, distant about half an hour's walk, came and invited Mrs. Last to their place, an invitation which she at once accepted, and I went with them. The settlement was simply the outside tembe of a Nguru village, all the round huts having been pulled down to make room for the cattle; the enclosure was covered to the depth of about a foot with ox-dung, but smooth and level, and the women of the village were all sitting on it busily engaged in sewing together dressed goat-skins, which the women wear instead of cloth. Many of them understood Kinguru, and some the Swahili language, so we were able to talk to them, and tell them why we were travelling about. Our reception altogether was most pleasant; they seemed to appreciate our visit, and requested us to stay with them, but we could not as there were other villages to be seen, and we also wanted to be off on the morrow.

The whole of this country is very hilly, having small streams of water running in every valley. There is plenty of good land, much more of which might be cultivated than what is. There is an abundance of fine trees, especially by the river side.

October 26th.—We started about 6.30 this morning for Msunga. The road was all even and good till we reached the village. After a short rest we had some conversation with a large number of Wanguru and Wahumba who had come to see us. This over, we started again over the Msunga hill, hoping to reach Vyadigwa. In this we failed, but reached Wadikundi. After crossing Msunga hill we had a long journey over level country. At 3 p.m. we came to the first village, where I decided at once to stop for the day.

We were glad to learn that the village belonged to a few families of Wakamba, who had settled there. Wishing to have a better opportunity of talking with these people and at the same time give my tired men a good rest, I resolved to stay over the next day. These Wakamba cultivate a little land, just sufficient to supply them with the corn they need; when their harvest is over, they go off every year on hunting expeditions, some even as far as the south end of Lake Tanganyika. The ivory obtained is taken home, and when they have sufficient they make up a caravan for Mombasa, where they sell it to the Banyans. I spent a good part of the day with these people. In the evening Mrs. Last and I went into the village, and remained some time talking with a number of men and women, who wished to know more about us, and our work.

Friday, 28th October.—We started a little before 6 o'clock. The first part of our journey lay over some hills; these passed, we came to a level plain. Here we had a heavy shower which lasted until we had reached Vyadigwa. At the first village we came to, the natives very kindly allowed us to use their huts in order to change our clothes. Resuming our journey at 10.30, we had a long march over the plain avoiding the path across the hills. At 4 p.m. we reached Kapa, Kwa Kigola. We set up our tent in the village in order that our men might have a chance of sheltering in the huts should it come on to rain in the night. It was fortunate we did so, for we had some heavy showers in the early morning.

Saturday, October 29th.—At daybreak it was raining heavily so we could not start; at 8 a.m. it cleared off a little, and all being ready we departed for the French Mission Station near Kwa Mdolwa. During the day we were misled by the guide, who took us over some very high mountains and through deep valleys. We were ascending and descending the whole day, and in the evening found ourselves at the foot of the hill on which the villages of Kibanti stand. There was nothing left for us but to go up and seek a lodging for the night. This was rough work after a day's marching, for there was no path, and we could only tell the position of the villages by the lowing of the cattle. We reached shelter just past sunset, but not in time to escape a heavy mountain shower, which drenched us all to the skin.

The natives made us welcome to their huts, happily for us, as it was too wet and too dark to set up a tent, so we made ourselves as comfortable

as we could under the circumstances. We slept well, and the next morning persuaded a native to show us the way to the French Mission. The scenery through which we passed was most lovely; ferns of endless variety, the most beautiful being arboreal species with trunks from 14 to 16 feet high, from the tops of which radiated graceful leaf-fronds 18 to 20 feet long. Going a little lower down, we came to a thicket of wild raspberries, which were very nice. The people who were with us (not Wanguru) did not know the fruit, and were surprised to see us eat them; but when they tasted they soon acknowledged that they were very good. Thousands of fine trees grew all around, very many of them having a clean trunk nearly, and some surpassing, 100 feet in height, without a branch or knot; some of these magnificent trees were 10 feet in diameter at the base; they would be very highly prized as timber could they be taken to any centre of civilisation. Many rivulets rushed down from the mountains on all sides, forming the source of the Mvue river, which flows past Kwa Mkungu into the Wami. After a day's hard travelling we reached the French Mission at Kinyumbi about 4 P.M. The missionaries gave us a very hearty welcome, and after giving us some refreshments placed a house at our disposal, and wished us to make ourselves as comfortable as possible. They would have supplied us with food and everything necessary for all the time we might stay, but we could hardly think of permitting such kindness; they sent us, however, fowls and vegetables as soon as we entered their house, and kept us supplied with vegetables and fruit all the time we were with them.

We remained here until the following Wednesday, November 2nd. At 6.30 A.M. on that day all was ready, and having thanked Père Machon for his great kindness to us, and bid him and his colleagues farewell, we started for Kwa Mchiropa. The country here is very thickly populated, villages occurring all the way along the road. Besides many minor places we passed Kwa Mkungu, Kwa Masengo, Mto wa mawe (here we met some soldiers who were bringing us books, papers, and letters), and at about 3 o'clock reached Mchiropa. Here we camped.

The next morning we started early, and passing by Mbomero, Kwa Mpani, we reached Mkundi about 9.30. Here we rested for the day, and at midnight struck our tent and started to cross the Mkundi forest. It was a lovely moonlight night, and the journey was really delightful; there is something enchanting in a journey through a great forest at night; the rocks, trees, and shadows apparently changing their position so silently, makes one feel to be in some fairy-land. We reached Nagubika at 8.30, and at 9 we were at our old resting-place. Here we stayed and had breakfast, and at 11 A.M. started again for Mamboia; we arrived at 1.15 P.M., and were heartily welcomed both by the natives and our own people.

I have enclosed a rough map of our journey into Nguru. It pretends to be only a sketch-map, sufficient perhaps to give an idea of the

course we took, and the nature of the country. I used my prismatic compass for the bearings of the different places, and from the data so obtained drew the map. I have drawn on it also the roads and places which I passed last year (1880) on my way to Zanzibar from Mamboia, via Bagamoyo. Most of the places passed are not marked on maps of East Africa. If it would be thought useful I will send some account of that journey. In the whole of the country between Mguru and Kibanti a European had never been seen before. The whole distance travelled during the journey was about 250 miles.

MAMBOIA, E. Africa,

Dec. 2nd, 1881.

GEOGRAPHICAL NOTES.

Projected Expedition for the Search and Relief of Mr. Leigh Smith.

—The following answer was received on the 11th ult. from Lord Northbrook, to the letter addressed to him by our President on the 12th of December last,* supporting the appeal of Mr. T. V. Smith on behalf of a Government expedition in search of his relative, Mr. Leigh Smith :—

“ADMIRALTY, 11th February, 1882.

“MY LORD,—In December last your lordship addressed me a letter, with which was enclosed one addressed to you as the President of the Royal Geographical Society from Mr. T. V. Smith, on behalf of the relatives and friends of Mr. Leigh Smith, bringing to notice the detention and possible critical position of that gentleman in his steam yacht *Eira*, with a crew of twenty-four persons, in the Arctic Sea, near Franz-Josef Land, and urging that an expedition should be despatched by Government for their relief.

“I have the honour to inform your lordship that I have brought those letters, together with the particulars furnished by the deputation from the Royal Geographical Society, which I had the pleasure of receiving in furtherance of the proposal, under the consideration of Her Majesty's Government.

“Although it cannot be admitted as a general principle that Government would be justified in recommending the appropriation of public funds for the purpose of undertaking the relief of explorers who have embarked upon adventures of discovery upon their own account, yet Her Majesty's Government are of opinion that special circumstances exist in the case of Mr. Leigh Smith on account of his previous services to geographical knowledge in the field of Arctic discovery by expeditions equipped at his own cost, in which he has displayed high spirit and good judgment.

“On a review, therefore, of the contents of the letters and documents

* ‘Proceedings,’ Jan. 1882, p. 57.

above referred to, while Her Majesty's Government are not of opinion that the circumstances are such as would justify the despatch of a naval expedition, they are prepared to propose to Parliament the vote of the sum of five thousand pounds towards the expense of sending relief to Mr. Leigh Smith and his crew.

"It may be assumed that this relief would be attempted by the despatch of a suitable steam vessel in the coming summer under instructions carefully drawn up by competent persons.

"The contribution would be subject to the condition that a sufficient sum will be raised for the object in view, and that arrangements will be made to the satisfaction of the Board of Admiralty for proper superintendence.

"I am, my Lord, your obedient servant,

"The LORD ABERDARE.

"NORTHBROOK."

The foregoing letter having been duly considered by the Council, it was decided that a copy of it should be sent to Mr. T. V. Smith, directing his attention to the grant, as to which the Admiralty would expect his reply; and also informing him that the Council had voted the sum of 1000*l.* towards the expenses of an expedition for the search and relief of Mr. Leigh Smith and the crew of the *Eira*.

To this communication Mr. Smith has replied as follows:—

"111, GROSVENOR ROAD, LONDON, S.W., 22nd February, 1882.

"SIR,—I have to acknowledge your letter of the 18th inst., enclosing copies of the correspondence between the President of the Royal Geographical Society and the First Lord of the Admiralty regarding the *Eira* Relief Expedition.

"On behalf of the friends and relatives of Mr. Leigh Smith and his companions, I beg to express my best thanks to the Council of the Royal Geographical Society for their contribution of 1000*l.* toward the expenses of the expedition, and also for the interest they have shown, and the exertions they have made.

"With reference to the Government grant of 5000*l.*, I should be obliged to you to express my gratitude to Lord Northbrook for the assistance thus given, and which I gladly accept as an important nucleus towards the expenses of the expedition.

"Respecting the conditions attached to the grant, I will communicate at a later date with the Admiralty when the arrangements for the expedition are further advanced.

"I enclose a letter for Lord Aberdare, thanking him for the personal interest he has taken in the matter, and for his valuable assistance, which I shall be much obliged to you to forward to his Lordship.

"I am, sir, your obedient servant,

"H. W. BATES, Esq.

"T. V. SMITH."

The Jeannette.—Telegrams from Irkutsk have been published in the London newspapers during the past month, giving further information regarding the steps taken to rescue Lieutenant De Long and his companions of the first boat. It appears that Mr. Melville, the engineer, having returned to Yakutsk after his first unsuccessful journey to the delta of the Lena in search of the lost party, was preparing immediately to start on a fresh search. Several Russian officers and men had volunteered or were engaged to join the expedition, which would be divided into three parties. The first party would leave Yakutsk about the middle of January, and all three would be in the wilderness by the 1st of March.—The following important telegram from Lieutenant Danenhauer, one of the survivors, was received at the London office of the *New York Herald*, and published in the *Times* of the 9th January, 1882 :—

“Irkutsk, February 4.—Lieutenant De Long is between the stations Bulun and Saskuarut, in a narrow wilderness 80 miles long, and devoid of game and habitation. The new search expeditions will build huts and go over every inch of the region, which is ploughed by heavy drift-ice every spring.—During the afternoon of the day before we parted Lieutenant Chipp's boat (second cutter) did better than ours. About dusk he was a thousand yards off our weather quarter, and was seen to lower sail, as if rounding-to. We lay for twenty hours under a triangular drag. At daylight nothing was to be seen. Chipp could not have got back to the islands in a north-east gale, and he was unable to carry his share of provisions. I observed a strong easterly current near the Lena delta, and there were masses of driftwood between us and the Siberian Islands.—We discovered Jeannette Island May 16, 1881 (?), in latitude $76^{\circ} 47'$, longitude $158^{\circ} 56'$ E. It was small and rocky, and we did not land upon it. Henrietta Island was discovered May 24, in latitude $77^{\circ} 8'$, longitude $157^{\circ} 43'$ E. We visited it, and found it to be an extensive island, animals scarce, many glaciers. A very large island, found in latitude $76^{\circ} 38'$, longitude $148^{\circ} 20'$ E., was named Bennett Island. On it we found many birds, old horns, driftwood, and coal; no seal or walrus; strong tidal action; bold and rocky. The south cape we named Emma. The general health of the crew during 21 months was excellent; no scurvy. We used distilled water, bear and seal meat twice a week, but no rum. Divine service was held regularly. We took plenty of exercise, and everybody hunted. Game was scarce, but we got 30 bears, 250 seal, and 6 walrus; no fish or whales seen.—All possible observations were made during the drift, the result showing north-westerly course, the ship heeling over, and being heavily pressed by ice most of the time. The mental strain was heavy on some of us. The result of the drift during the first five months was 40 miles by tidal movement of ice; very rapid drift the last six months. Soundings pretty even—18 fathoms near Wrangel Land, which was often visible

75 miles distant. The greatest depth was 80 fathoms: average depth, 35; bottom, blue mud; shrimps plentiful; meteoric specimens got from bottom; surface water temperature 20° above zero. The extremes of temperature of air were—cold, 58° below zero (Fahrenheit); heat, about 44° above. During the first winter the mean temperature was 33° below zero, second winter 39° below. During first summer mean temperature was 40° above zero. The heaviest gale showed a velocity of 50 miles an hour, but such gales were not frequent. Barometric and thermometric fluctuations were not great. There were disturbances of the needle coincident with the auroras. Telephone wires were broken by the ice movements. Winter's growth of ice was 8 feet. The heaviest ice seen was 23 feet thick. Chief Engineer Shocks's heavy truss saved the ship November 21 (1880?) from being crushed. Before entering the ice near Herald Island we visited Nordenskiöld's quarters during the previous winter, and found that he was safe. During the first week of the retreat from the *Jeannette* we drifted back 27 miles more than we could advance. The snow was nearly knee-deep.—The naturalist's notes were saved, but the photographic collection was lost with the ship. Lieutenant Chipp's 2000 auroral observations were also lost.—De Long's records found say Collins volunteered to stand by the dying sailor Erickson and let the others push south.—Jack Cole's mind is not entirely gone. He has not been violent for twelve days, but is happy and harmless. Getting home may restore him."

Mr. Edmond O'Donovan, the *Daily News* late correspondent in the Turkoman Country, will read a paper before the Society on the 27th of March, on the geography of Merv and the surrounding region.

Further Explorations by Mr. Lawes in the South-Eastern part of New Guinea.—Since his return to New Guinea the Rev. W. G. Lawes* has profited by his opportunities of gleaning new geographical and ethnological information regarding this little-known island, and sends us, in a letter dated Nov. 15th from Port Moresby, an account of various excursions he had made up to that time in company with his colleague the Rev. J. Chalmers. With regard to Port Moresby itself, he says that it has considerably improved both in healthiness and in the social and moral condition of its native inhabitants. The latter were formerly dreaded along the coast as a tribe of pirates and marauders, but for seven years past they had given up fighting and were now honest and trustworthy. As a harbour, Port Moresby still maintains its pre-eminence as the safest and most accessible along the coast. Mr. Lawes' first excursion since his return was to Hall Sound. Selecting a small village named Delena, on the eastern side of the Sound, as their headquarters, he, his wife, and Mr. Chalmers visited by boat the districts of Maiva and Kevori, on the western side (south-east of Cape Possession)

* Vide President's Annual Address, 'Proceedings,' 1881, p. 395.

calling on their way at some villages belonging to a populous but quarrelsome tribe in the Roro district, on the northern side. The coast at Maiva being without protecting reef, is exposed to the full force of the south-east monsoon, and it was only by the skill of a native pilot that the visitors were able to effect a landing. Immediately the boat touched land it was seized by about a hundred of the villagers, who quickly hauled it up on the beach, out of reach of the roaring surf. They were thus for the time completely at the mercy of these untried people, and the result justified the trust reposed in them. Mr. Lawes adds that he has never yet had to repent treating the natives with perfect confidence. The Maiva people he describes as a fine race. He had often seen some of them before at Port Moresby whither they resort every year for trading purposes. The colour of their skin is rather light; the men are well-grown and muscular, and the women fine-looking but disfigured by hideous tattoo-marks. The Maiva district proper contains sixteen villages, lying near each other along the beach and on the banks of a salt-water creek called Tovila, which surrounds the district, making Maiva really an island. An umbrageous grove of coco-nut trees covers the whole district, and the trees are exceedingly productive. The natives had never seen a white woman before, and crowds followed them wherever they went. The sacred house, a fine building 120 feet long by 24 feet broad, was assigned to them for their lodging. A fringe eight feet deep, made from the leaf of the sago-palm, formed a graceful curtain over the entrance. Inside, the building was furnished with a series of shelves or platforms, constructed of the midribs of leaves of the same species of palm, and on one of the sides was a little enclosure where charms were kept, some of which, however, were removed, before the sacred place was given up to the white visitors. The upright posts were mostly carved, one at the entrance having a full-length figure of a crocodile on one side and a human figure on the other. The "dupu" or sacred house has its times of more than ordinary sanctity; at such periods it is profusely decorated, and no woman's or child's eye is permitted to see it. A number of men take up their abode in it for about two months, and whoever enters must hold no intercourse with the outer world. Food is cooked for the inmates by the women and introduced through holes left for the purpose. So complete is the isolation that if one of the inmates dies during the period, the corpse is buried under the house, unknown to the rest of the tribe; and on the other hand, if any of the villagers die, the knowledge of the fact is kept from the inmates of the dupu, for so long as the "taboo" lasts. At the end of the period a great feast is got up to celebrate the occasion, and the long-enclosed men emerge profusely decorated. The sacred house of each village generally stands at the end of the single street; the other houses are of poor construction, but have a beautiful appearance on account of the handsome crotons and dracænæ growing at their sides and

carefully tended. The district beyond Cape Possession as far as Bald Head is called Elema. It comprises many villages, and is a sago-producing region. After a visit to Kevori, five or six miles to the north-east, which no white man had visited, Mr. Lawes and his party returned, and subsequently made an excursion to Naala, a district inland from Cape Suckling. The distinguishing feature of this group of villages is that the people are ruled over by a queen, the only case Mr. Lawes heard of in New Guinea. They next visited Kabatsi, a district lying some distance up a large river named Aroa, which falls into Redscar Bay. The mouth of the river is called Toutou, a name which Captain Moresby erroneously applied to the mouth of the Laloke at Manumanu. At Manumanu there are three rivers or creeks; one, the Usborné, is the same as the Laloke, the other two being salt-water creeks, one of them, named Apisa, being on the northern side of Moresby's "Galley Reach." Entering the mouth of the Aroa on a calm morning, Mr. Lawes found it a fine large river, with high banks clothed with a luxuriant forest vegetation. About 16 miles upwards he came to the mouth of a tributary, beyond which the Aroa becomes exceedingly tortuous, and in places very narrow with a rapid current. He reached Ukankana, the principal village of the Kabatsi, situated in a very fertile district comprising eight villages in all. The people here lived in the midst of abundance, and were of peaceful disposition. They were preparing for one of their numerous festivals, and Mr. Lawes noticed a remarkable headdress worn by the holiday-makers, being a framework of twigs (the middle ones 18 feet long) supported by waist and shoulders, and ornamented with feathers. The chief was conspicuous by his breast-plate, formed of the lid of one of Huntley and Palmer's biscuit tins. The magnificent Goura pigeon here abounds, and an immense diversity of beautiful birds swarm in the woods on the banks of the river.—On the return of the party from this visit they discovered that Redscar Head was an island. They found a snug harbour for small vessels off the village of Kido, just under Redscar Head. They went through the inland passage behind the Head, in their whale-boat, and at the end of a journey of 16 miles (although the direct distance is only four) they came out at Lealea in Caution Bay. With the exception of about two miles they found fine open water and had no difficulty anywhere with their large boat.

Lake Nyassa.—Mr. James Stewart, C.E., arrived at Livingstonia towards the end of August last in company with Mr. R. Ross, the artisan who is to be employed on the road to connect Nyassa and Tanganyika. Dr. Laws and Mr. Stewart proceeded at once up the lake in the *Ilala* to the new port of Bandawé, where preparations for forming a new settlement have already been begun. At Mombera's on the healthier uplands, where it is proposed to establish a sanitarium,—in addition to the one at Maliwandu's, 50 miles from the north end of the lake, on

which Mr. Stewart is by this time probably engaged,—war has interfered with the operations of the Free Church Mission, the Angone being busy making raids on their neighbours in all directions. Soon after the date of his last letter, Dr. Laws was to accompany Mr. Stewart in the *Ilala* to the north end of the lake to begin the new road and the mission among the Chungus. A number of volunteers from Kasanga's and Impango's had arrived at Livingstonia for work on the road between the lakes, and Mr. Stewart had already got as many men as he wanted to take from the south end of Nyassa. The London Missionary Society, we learn, have made arrangements to send out their auxiliary steamer to Quillimane, and she is to have more sailing and less steaming power than the *Ilala*. She will be taken by the African Lakes Junction Company from Quillimane to the north end of Nyassa, and thence conveyed by Mr. Stewart over the new road to Lake Tanganyika. Dr. and Mrs. Hannington, with Mr. A. Simpson, another artisan, arrived at Quillimane on October 25th, and were to proceed up the Zambesi in the *Lady Nyassa* after a fortnight's delay.

Recent News from the Congo.—Mr. W. Holman Bentley and others furnish fuller particulars of their recent proceedings on the Congo than were given in our January number.* Mr. Bentley, before referring to his own doings, mentions that Mr. Stanley, on his way up to Stanley Pool, passed from Isangila to Manyanga entirely by river, but after that he was obliged to make a road some seven miles long past the Ntombo Mataka Falls, when he was again able to take to the river. Mr. Bentley also learned from M. Harou, who is in charge of the Belgian dépôt at Manyanga, that the land included by the little stream to the west of the dépôt hill and by the Ntombo Mataka Falls has been ceded by the natives to the Belgian expedition. The missionaries, therefore, deemed it best to choose the most eligible site below their boundary. Mr. Bentley is building a house on a hill about 100 feet above the water-level, and 200 yards away from the river bank; to the east of their position runs the boundary stream, and on the west there is a rocky torrent bed, which ends in a creek, forming a good landing-place for stores. Between the river and the base of the hill there is a very rich piece of garden ground, at present cultivated by the women of Ntombo and Ndandanga, of which Mr. Bentley hopes to obtain possession later on. There is abundance of wood in the steep ravines in the rear, and in every respect, Mr. Bentley thinks, a very suitable spot for their purpose has been secured.—The missionaries have spoken of the district where they are, as Mbu, rather than Manyanga, but properly speaking it is neither. Mbu district lies some five or six miles inland from them, and Manyanga is only the name of the market which lies an equal distance to the north of their station. As the Belgian expedition, however, have

* See *ante*, p. 45.

adopted Manyanga as the name of their settlement, the place will probably always be best known by that name. The towns of Ntombo, Ndandanga, and Kitambika are all within a short distance, while on the opposite bank the important Banzas of Ugombi, Kiwala, Ndungu, and Ndinga, can be easily reached by boat or canoe. A good many traders cross over from the left bank to go to the markets at Manyanga and Ntombo, and even to the great Nkandu Yalala market.—Père Augouard informed Mr. Bentley that when at Stanley Pool he heard from one of the men at the French station that M. Savorgnan de Brazza's reported fine road, of six days' journey, between the headwaters of the Ogowé and the Alima-Mpaka river was in reality considerably longer, and that in their march along the greater part of it the party were up to their knees in water.—Messrs. Crudgington and Dixon arrived at Banana on October 20th, having with them a few Kroo boys whom they had engaged on the voyage down the coast, for which purpose Mr. Comber had also gone to the Bonny river. The latest letter from Banana (November 23rd) announces his return from the Kroo coast with forty-two carriers, and that the steel boat taken out by Mr. Crudgington had been put together and pulled up to Mussuca without any difficulty.

Central Australia.—Mr. D. B. Bain has lately presented a report to the South Australian Government on his examination of the country for a distance of 205 miles north of the "Government Gums," with a view to railway extension in that direction. He left the Gums for Killalpininna on August 27th, 1881, and his investigations showed that, with the exception of bridging such creeks as the Frome (900 yards wide), Nantiwarpanna, Clayton, and Dulkaninna, all requiring large flood openings, the work would be light, but on reaching the Isa Creek, he found that the whole country to Killalpininna was periodically subject to heavy floods. The approaches to that point are also rendered so difficult by sandhills, &c., that he abandoned that line of country, and made first for Kopperamanna, afterwards going still further east to Modawilpanna, which he heard was a good spot for crossing the Barcoo. Here the Barcoo narrows very considerably, and on each bank there is an extraordinary mass of red flinty rock in huge blocks, honeycombed in a most singular way, forming as it were two natural abutments for a bridge. The width of the river is 240 feet, with a depth of about 20 feet to flood-level. The Barcoo, called also Cooper's Creek, has a very sluggish stream, barely running one mile a day, and rises only when Lake Hope is full. The objections to this point for crossing are the sandhills on the north, and Mr. Bain, therefore, thinks it would be better to cross near Kandamookaninna, but there the Barcoo becomes nearly two miles wide; or rather the country is flooded to that extent, with a depth of four to five feet, and in some parts of nine feet, but the sandhills would thus be avoided. Mr. Bain observes that the lagoons and

flats in this region are noticeable for the absence of everything in the shape of vegetation. From Modawilpanna he went across country to Apootanganie, but the sandhills are so formidable that he doubts the practicability of making a railway there. From Apootanganie he went to Cowarie over very stony table-lands, crossing on the way only one large creek, the Mangarane. From Cowarie Mr. Bain travelled due west for some four miles over sandhills to the Warburton Creek, called the Diamantina in Queensland, but the flooded state of the country would not admit of his crossing this stream; and he learned that in flood-time the Warburton could not be crossed under 15 miles. Unless this country be examined to the north of Lake Eyre and westwards to the telegraph line, it would be impossible to say whether a railway could be taken in that direction, the general impression being that there are a large number of sandhills. The main channel of the Warburton Mr. Bain estimated to be nearly half a mile across, with a depth of 40 feet in the centre, and he learned that the creek was even worse for many miles east; moreover, there is no good stone in the neighbourhood, and there would be great difficulty in finding suitable soil for embankments. Mr. Bain then returned to Kopperamanna, and thence *via* Boolcantaninna and the Kooreneenna and Tackaninna water-holes, across country to a large water-hole south of Lake Harry and the Hergott Springs. Between Kopperamanna and Boolcantaninna there is much flooded land, but the depth of water does not appear to be considerable. This line of country Mr. Bain thinks would be on the whole the best for a railway; it is easy, flat, and with isolated hills, which could be avoided without difficulty. The ground is covered for the whole distance with copper-coloured stones, which could be used for ballast, but no stone or timber suitable for building is to be found between Farina and Cowarie, nor could Mr. Bain hear of any limestone; there is no permanent water, and in many places no firewood for many miles. The Barcoo, owing to the small velocity of its stream, is less formidable than many smaller creeks, and Mr. Bain thinks that, provided substantial earthworks were made and pitched with stone, the flood opening could be modified to a great extent. The Warburton has a rather swifter stream than the Barcoo, which is really only a series of lakes and lagoons. The flood takes eleven days to find its way from Kopperamanna to Killalpininna, a distance of 10 miles, and its velocity can hardly be appreciated.—Though he was not instructed to do so, Mr. Bain also examined the country between Farina and Stewart's Creek, a distance of 100 miles, in order to satisfy himself as to the relative merits of the routes north and south of Lake Eyre. As far as he could judge, the telegraph line is on the best route, the track having been apparently chosen in order to pass the various springs in the country; and a railway approximately following this line could be constructed cheaply. There are two ranges to cross, one near the

Frances Creek, and the other near the Finnigs, but they would not prove an obstacle. Little flooded country would be traversed, the creeks being for the most part well-defined watercourses. The most important of these is Stewart's Creek, 330 yards wide and 20 feet deep, which floods some 550 yards of country on the east side. There are very steep banks on the west side; it has a sandy bottom, and there is a good supply of box trees. Mr. Bain has no hesitation in saying that this is the proper route for the transcontinental railway.—Writing from Beltana on October 18th, 1881, Mr. Bain supplements his other reports by some notes on the country north-east from Farina in the direction of the south-west corner of Queensland. This country is undulating, but the hills are all low. The Frome Creek, 21 miles from Farina, being half a mile in width, would be troublesome to bridge, but it is rarely flooded—perhaps once in six or seven years. There is no permanent water between Farina and Blanchewater Station (80 miles apart), but there are three large water-holes within 25 miles of the latter place, which are liable to dry up. From Blanchewater Mr. Bain rode for 35 miles on the same bearing towards Monte Collina Station, and for 27 miles he found the country easy, with only a few small creeks to cross; but for the last eight miles it became low, and is apparently flooded, although to no great depth. As the country is well covered with fine bushes, the floods evidently do not last for any time. This tract of country is flooded by the water overflowing from Lake Frome into Lake Blanche. From an elevation four miles south of the Monte Collina Station, Mr. Bain was able to examine the country for a considerable distance with a field-glass, and it appeared to him to consist of low sandhills with intervening flats, well covered with bushes. As far as flooded country is concerned, this would be a safer route to Queensland for a railway than the one crossing Cooper's Creek, along which stock are taken. In concluding his report, Mr. Bain speaks very highly of his camels, and he says he could not have made the journey of 933 miles in eight weeks with horses, travelling as he did sometimes for three days without water.

Island of Diego Garcia.*—Diego Garcia, the southernmost island of the Chagos Archipelago, is an atoll, about 13 miles in length north and south, by about eight miles in extreme breadth. The coral of which it consists is raised generally from three to four feet, and nowhere more than six feet, above high water, but the trees with which it is thickly covered attain in several places a height of about 150 feet. Thus it can be seen at a distance of ten miles. Chief amongst the trees are the coconut palms, numbering upwards of a million, the supply of oil manufactured from the produce of which, forms the only staple of export from the island. The lagoon of the atoll forms an extensive harbour, in the

* From the Admiralty "Hydrographic Notices," No. 32, 1881.

length, and runs from Otarunai to Sapporo ; between Otaru and Zenibako the only available road, which had been cut in the cliff, has been used for the railroad, to the great discontent of the inhabitants. It seems generally believed that the line was constructed too hastily and without sufficient ballast, which will have to be added at a considerable cost.

Projected Expedition through Southern China and Burma.—Early in December Mr. A. R. Colquhoun, of the Indian Public Works Department, started for Canton, in company with Mr. C. Wahab, to undertake a journey, which promises to be of great interest, through Southern China and across the frontier through Burma to Rangoon. When he left England, his intention was to start from Canton in order to attempt the ascent of the Si-kiang—often called by foreigners the Canton river—to the highest navigable point, and thence pass through the southern part of the Yünnan province and the Shan States, by way of Kiang-hung, Kiang-tung, Zimmay, and Shuaigyeen or Tonghoo, to Rangoon. He expects to travel over about a thousand miles of new ground and to bring back a full description of 1500 miles of country hitherto undescribed ; on the Burmese side of the Chinese frontier he intends to avoid the routes of McLeod in 1836 and of the French expedition in 1867–8, in order to cover entirely new ground, and in Southern China he hopes to be able to study the almost unknown Miao-tsze tribes. The two great objects of Mr. Colquhoun's adventurous journey are to collect information of permanent value to geographical science by taking latitudes, fixing positions, &c., and to gather materials for a journal of travel likely to prove interesting to the general public. Having received a certain measure of support from one or two Chambers of Commerce in this country, Mr. Colquhoun proposes to extend his original plan of operations by availing himself of his opportunities for executing such initial survey of the country traversed as may be required, and for reporting on the various trade-routes and the prospects of developing trade between South-Eastern Burma and Western China. There appears every reason to hope for good results from this expedition, as Mr. Colquhoun has already been employed for ten years on surveying and engineering work in various parts of British Burma, and was besides attached in 1879 to the Government of India Mission to Siam, which paid a visit to Zimmay, the northernmost Shan State, which is tributary to Siam, and which, roughly speaking, lies midway on a direct line between Maulmain and Kiang-hung on the south-western frontier of China. The importance of this as the best land route to Western China was recognised as far back as 1864, when a survey was made of the first 250 miles to the north-east frontier of British Burma near Tonghoo, and Mr. Colquhoun will in any event do good service by surveying the remainder of the route, and by making us thoroughly acquainted with the independent Shan States.—A telegram has been received announcing the arrival of Mr. Colquhoun and his companion at Canton, and stating that, having made all their preparations there, they intended to leave for the interior on

February 8th. They will have with them an interpreter, ten porters, and one or two servants, and propose to travel in Chinese dress in order to avoid attracting unnecessary observation.

Extension of Telegraphic Communication in Siberia.—We learn from the St. Petersburg papers that it has been decided to open telegraphic communication with Yakutsk, on the river Lena, by constructing a line from Irkutsk, some 2000 miles distant, across regions, the nature of which renders such a work exceptionally difficult. The line in question has for several years been under consideration by the local administration, and it is possible that the difficulty and delay experienced in communicating with the survivors of the *Jeannette* may have induced the authorities to enter upon the work without further delay. The 21,600 lbs. of gold-dust found in the Lena basin, the fur trade, the abundance of fish and salt, and the enormous distance which separates Yakutsk from Irkutsk, the seat of the administrative government as well as the headquarters of the gold trade, are all valid reasons for the construction of such a line. In evidence of their desire to see it carried out, the local population had already subscribed 7500*l.* towards the cost, and had undertaken to furnish gratuitously 26,000 telegraph posts, besides building certain stations. The cost of the whole line is estimated at 90,000*l.*, and the inability of the telegraph administration to meet this large expenditure has caused the work to be put off. During his recent visit to St. Petersburg, however, the Governor-General of Eastern Siberia has made an arrangement with the Minister of the Interior, by which a section of the new line will be commenced during the present year from Irkutsk to Verkholensk (180 miles), and the necessary work of exploration will be pushed forward to Vitine, an important gold centre, the cost being defrayed by the subscriptions already raised.

Journey of MM. Bonvalot and Capus from Bokhara to Krasnovodsk.*—Starting from Bokhara on October 28th, 1881, MM. Bonvalot and Capus travelled to Charjui, on the Amu-daria, by way of Karakol, a small town, some 40 miles from which the Zarafshan river loses itself in the sands in the direction of Lake Dingiz. This lake, according to the natives, is small, and its waters fetid and brackish; it receives no water from the Zarafshan, except in the winter, when irrigation is stopped in the oases of Samarkand and Bokhara. In the neighbourhood of Karakol the country has the same appearance as near Kilif and Patta-Guzar, being a naked plain, except for the trees at the banks of the deep *aryks*, from which water is raised for irrigation purposes. The chief products cultivated are *jugara*, or millet, and cotton, which finds a ready market at Bokhara. At Khoja Daulat, some 10 miles from Karakol, the sands commence, trending in a south-easterly direction, and driving the inhabitants before them. On leaving the village, the party encountered the sands in considerable masses, forming a chain of hillocks 50 feet high,

* From a communication made to the Geographical Society of Paris on Feb. 3rd.

which had to be crossed on the way to Farab on the Amu, where the ferry-boat was taken to Charjui. There they embarked in a Bokharan vessel to Ilchik, where they engaged a Turkoman boat to take them down the Amu. Between Kabakli and Uch-Uchak, on the frontier line between Bokhara and the Amu-daria province, the river is very unsafe, especially in winter, owing to the presence of bands of marauding Turkomans, and great precautions had in consequence to be taken; fortunately, however, Petro-Alexandrofsk was reached without accident on November 10th. MM. Bonvalot and Capus remark that in the numerous islands in the river abundance of game is found, pheasants, partridges, and boars, which resort thither when the water is low. In spite of the low-level of the Amu at the time of their journey, there was an enormous mass of water in the river, which, they note, eats away its right bank, while on the left it throws up the sand blown into it by the north-west winds. Below Charjui the country along the river is uninhabited, except at Ustik and Kabakli, but the ruins seen everywhere showed that in former times it was both populous and cultivated. The flora on the banks is very poor, and generally of a saline character; the *jidda* (*Eleagnus hortensis*) was seen, one kind of poplar (*Populus diversifolia*), some species of tamarisk, and in places quantities of reeds. After visiting Khiva, which they describe as a very inanimate place, MM. Bonvalot and Capus proceeded to Zmukhdin, a distance of two days' journey, at the edge of the Ust Urt Plateau, where they hired camels from the Yomud Turkomans to take them and their slender baggage to Krasnovodsk. On the way to the Cherishli well, where they met the Russian Oxus Expedition, they frequently saw ruins which date from the time when the Amu-daria flowed into the Caspian. The Cherishli well is in a dried-up gulf of the ancient bed of Lake Sary-Kamuish, which in former times was almost as large as Lake Aral. From Cherishli the party went straight to Krasnovodsk without meeting any one on the road, and the march was rendered exceedingly uncomfortable by the snow, rain, continuous frost, and cold wind.—Water was scarce on the Ust Urt Plateau and hardly drinkable, and sometimes the party had to travel 60 or 70 miles before they could find water for their camels. They arrived at Krasnovodsk on December 10th, and after a delay of a fortnight they found an opportunity for crossing the Caspian to Baku, whence they proceeded to Tiflis.

Public Schools Prizes Examinations.—The examinations in Geography, conducted under the direction of the Society, will take place at the invited schools on Monday, the 27th of March. The special subject this year is Australia, excluding Tasmania, and the examiners are Professor H. N. Moseley, F.R.S., for Physical, and Sir Arthur Blyth, K.C.M.G., for Political Geography. In addition to the gold and silver medals offered as heretofore, certificates will in future be given to the candidates selected by the examiners for honourable mention.

The German Society for Commercial Geography.—Few societies connected with geography have made such rapid progress as the “Central-verein für Handels-Geographie.” Although it has been in existence scarcely four years, it numbers 3400 members. The parent society has its seat in Berlin, but branches have been founded in seven other German cities, and affiliated societies have been established in South America, Australia, and South Africa. It publishes a weekly newspaper, called *Export*, of 16 pages folio, besides a periodical of somewhat more scientific pretensions, under the title of ‘Geographische Nachrichten,’ three times a year. Amongst other functions the society acts as the organiser of industrial exhibitions, one of which, dealing with German products, is now open at Porto Alegre, in Brazil.

THE UNITED STATES ARCTIC EXPEDITION TO LADY FRANKLIN BAY.

The following interesting report of the proceedings of Lieutenant Greely, in command of the United States expedition to Smith Sound, has been communicated to us by the Lords Commissioners of the Admiralty. As we announced in a former number of the ‘Proceedings,’* this important expedition consists of twenty-four officers and men, chiefly belonging to the Signal Service of the United States Army, and has for its chief object the founding of a station for scientific observation in this part of the Polar area:—

FORT CONGER (Lady Franklin Bay), Grinnell Land,
August 15th, 1881.

SIR,—I have the honour to make the following report, regarding the progress of the International Polar Expedition, which I have the honour to command. Leaving St. John's N.F. at noon, July 7th, the harbour of Godhaven, Greenland, was reached 9 p.m., July 16th. The voyage was made in the face of continuously adverse winds, experiencing two strong northerly gales, and constant cloudy and foggy weather. The ship behaved admirably. The only ice seen south of Cape Farewell, were a few icebergs off Funk Island, and about forty in 52° N., 53° 15' W. Pack-ice was fallen in with at 10.30 p.m. July 12th, in 61° 30' N., 53° 30' W., and was left behind at 3 a.m. July 13th. A second pack was encountered the same day at 2.30 p.m. in 62° 30' N., 53° 15' W., and passed through in an hour. Neither pack offered any obstruction to free passage, or caused the slightest delay. They both consisted of ice-floes (varying from one to eight feet above the water), which, coming from the east coast of Greenland, had drifted with the southerly current from Cape Farewell into Davis Strait. Not a dozen icebergs were seen in Greenland waters, until Disco Bay was reached, when over a hundred were counted at one time. From Herr Krarup Smith, Inspector of North Greenland, I learned that the past winter in Greenland (except a brief period of cold in March) had been one of marked and unusual mildness, and that the ice north of Upernivik had broken up very early. Delaying his vessel fifteen hours on the expedition's account, he left the next day for an official inspection of Proven and Upernivik, assuring me of all possible aid and assistance from himself and all other officials. On July 20th, Dr. Octave Pavy joined the expedition as acting assistant surgeon. At Godhaven, twelve dogs, a large quantity of dog-food, and some sealskins were procured. A considerable quantity of “mattak” (skin of the white whale, a very valuable anti-

* ‘Proceedings,’ 1881, p. 484.

scorbutic), and a few articles of fur clothing were obtained by barter, as they could not be bought for money. Hard bread and tobacco were principally given in exchange. Valuable assistance was given in this matter by the wife of Inspector Smith, and by Mr. Fleischer, chief trader and Governor of Godhaven. The remains of the house purchased in 1880 were taken on board, as well as 3000 lbs. of buffalo pemmican placed at my disposal by H. W. Howgate of Washington. Nine dogs which were at Rittenbenk were also bought of Dr. Pavy. A good set of observations for time was made July 19-20th at the only hours the sun shone during our stay at Godhaven. Leaving Godhaven the morning of the 21st, the vessel reached Rittenbenk the same forenoon. At that point were purchased a number of sealskins, a large quantity of dog-food and other minor articles, which had been accumulated for the expedition through the energy of Dr. Pavy. The nine dogs before mentioned were taken on board. Mr. Henry Clay there joined the expedition under the status of a signal service employé. Being delayed by the fog, Lieutenant Lockwood was sent with a party to obtain birds from Prindsens Island. He returned that evening with sixty-five guillemots. It was said at Rittenbenk that the spring had been the most forward one for years. Leaving Rittenbenk 2.15 p.m., July 22nd, and running through the Waigat, the steamer was off Upernivik 9 p.m., July 23rd, but owing to fog, could not enter the harbour until the next morning.

Two Esquimaux whom I had understood would accompany the expedition were not available, and in consequence a trip to Proven, about 50 miles distant, was necessary to obtain others. Skin clothing could not be obtained except ten suits, which, having been made by order of the Danish Government for the use of the International Polar Station of Upernivik of 1882-3, were sold, through the kindness of Inspector Smith, to the expedition. A severe storm setting in prevented Lieutenant Lockwood (Mr. Elberg, chief trader at Upernivik, had offered to accompany us to Proven) from starting on the 24th. On the morning of July 25th Lieutenant Lockwood left in the steam-launch *Lady Greely* (which had been put into the water for the trip), taking a circuitive route inside the islands, rendered necessary by bad weather. Lieutenant Lockwood returned early on the 28th, bringing for service with the expedition a native, Jans Edward, and a half-breed, Frederik Thorley Christiansen, who were contracted with that day. Lieutenant Lockwood also procured about a dozen suits of skin clothing, which, though second-hand, are very serviceable. He had killed 120 guillemots during his voyage. The launch behaved admirably, both as a sea boat and under steam. Lieutenant Kisingbury, by my orders, made two visits, July 24th and 25th, to the "Loomery," near Sanderson's Hope, bringing back the first day 305 birds, and on the latter 115, all guillemots. Ten dogs (five of whom have since died of dog-disease, and must have been sick when sold to me) were procured from Mr. Elberg; additional dog-food, sledge-fittings, dog-harness, and sealskins were also bought. It was through the marked interest and kindly influence of Inspector Smith (whom I found at Upernivik) that the expedition secured the services of the natives and obtained so fair a stock of needed articles. The meteorological records of the past winter show it to have been very mild, and the spring very early. Inspector Smith told me that in fourteen years Upernivik has never been so green. Reports from Tessiusak were to the effect that the ice, breaking up very early, was all gone.

On the afternoon of July 29th the anchorage of Upernivik was left, and at 7 p.m., having run out the southern way, the vessel was distant three miles from Upernivik, just off the island to the west, running northward a few hours, the middle passage was taken, and at 7 a.m., July 31st, the engines were stopped, as the dead reckoning placed the vessel only six miles south of Cape York, and dense fog prevented land from being seen. An hour later, the fog lifting a few minutes, showed land about five miles distant. This experience of "the middle passage" may

be fairly said to have been without parallel or precedent. The run of the English expedition of 1875-6, from Upernivik to 45 miles south of Cape York in seventy hours, is said to have been unprecedented. Our passage by the same route, and to within five miles of Cape York, was made in thirty-six hours, *half the time* taken by the expedition under Sir George Nares to run a less distance. Nothing in the shape of a pack was encountered in Baffin's Bay, but in about 75° 08' N., 63° 40' W. a pack was seen to the westward, whether open or compact was uncertain. A Polar bear (*Ursus maritimus*) and a seal (*Phoca barbata*) were killed on small detached floes in the "middle passage." July 31st was lost through foggy weather obliging the vessel to "lie to." At 8.15 A.M., the fog lifting, disclosed Petowik glacier, near to the north of which, in small patches of dirty reddish colour, was seen the red snow among the "Crimson Cliffs" of Sir John Ross. Sighting the Carey Islands at 3.10 P.M. that day, two parties were landed on the south-east island at 5.45 P.M.

The party under Dr. Pavy obtained from the cairn on the summit, the record left by Mr. Allen Young in 1875 and 1876, which forms enclosures "A" and "B";* copies were left in the cairn, and an additional record, enclosure "C." With Lieutenant Lockwood I found and examined the whale-boat and depôt of provisions left by Sir George Nares in 1875, which were in good and serviceable condition. A record in the boat was taken away (enclosure "D"), but a copy of it, and a new record (enclosure "C") were left in its place. At 12.30 P.M., August 2nd, Littleton Island was reached. A personal and exhaustive search of seven hours was made to find the English mail, which, in four boxes and three kegs, have been forwarded to you, in order that they may be returned to England. There was a very small cairn near the mail, but with no record. A record (enclosure "H") was left by me. Lieutenant Lockwood with a party landed about 6½ tons of coal as a depôt of fuel for possible future use. It is in and around a large cask on low ground, on the south-west side of the island, facing Cape Alexander. Lieutenant Kisingbury and Dr. Pavy, by my orders, visited Lifeboat Cove to communicate with the Etah Esquimaux, and see the *Polaris'* winter quarters.

Several photographs of the surroundings were taken by Sergeant Rice, and a number of relics brought off, which will be forwarded to you. The transit instrument was found about 20 feet from the cairn. The Etah Esquimaux have evidently quitted the place, as all traces were old—a year certainly, and probably two or three years. In searching on Littleton Island for the Nares Cairn, about 50 small cairns (many evidently for game) were found, in two of which records from s.s. *Erik*, Capt. Walker, June 20th, 1876, were found, and form enclosures "E" and "F." A cairn carefully built and with an aperture at the base, probably that of Sir George Nares, was found open and empty. Lieutenant Lockwood, who later was sent to go over the ground a third time, concluded with me that the open cairn was that of Sir George Nares. A record was made by Lieutenant Lockwood for deposit, but a message sent him when the English mail was found caused him to withdraw it, or he was erroneously informed that I had found the cairn sought for. It probably had been plundered, as a piece of a London newspaper, the *Standard*, was found by me in the snow on the west side. It contains a notice of a lecture by Sir George Nares in 1875; it forms enclosure "G." Some repairs to the wheel of the ship caused several hours' delay, but Littleton Island was left at 10.45 P.M. The weather being very fair and no ice visible, I did not dare to take time to examine the 240 rations at Cape Sabine, but directed the captain to run direct for Cape Hawkes. On August 3rd Cape Sabine was passed at 1.50 A.M., and Cape Camperdown at 4.10 A.M.

* The originals of these and the other documents mentioned in the present report have been sent by the United States Government to the Admiralty, and were included in the communication to the Society. It has not been thought necessary to print them.—ED.

At 8.40 A.M. off Cape Hawkes, and at 9.10 A.M. lay to, about two miles north of it, between the mainland and Washington Irving Island.

Sent two parties under Lieutenant Lockwood and Dr. Pavy to examine respectively the south and north end of Washington Irving Island.

With Lieutenant Kisingbury, Mr. Clay, and a number of the men, I proceeded to the main shore, and examined the English depôts of 1875. The jollyboat was found in good condition, and being short of boats it was taken by me. I have named it the *Valorous*, it having belonged to H.M.S. *Valorous*, connected with the Nares Expedition. There was a large quantity of bread, some mouldy; two kegs of pickles, two partly full of rum; two barrels stearine, and a barrel preserved potatoes. A keg of piccalilli (I having none in my stores) and one of the kegs of rum were taken, and three cans of potatoes, to test them and the method of cooking them. The remaining stores were placed by my party in a better condition to resist the weather. Several photographs of the surroundings were made by Sergeant Rice.

Starting again at 10.10 A.M., and running out to the southward, Lieutenant Lockwood's and Dr. Pavy's parties were picked up at 11.40 A.M. Lieutenant Lockwood found, in a cairn on the summit, a record of Captain Nares, deposited in 1875, and countersigned by him in 1876, which forms enclosure "T." A copy was left, together with a new record (enclosure "K"). Passed Cape Louis Napoleon 1.10 P.M., and Cape Frazier at 3 P.M. Washington Land was first sighted at 3.55 P.M. through openings in the fog, which commenced setting in about 5 P.M. The 80th parallel was crossed at 5.30 P.M. abreast of Cape Collinson, where 240 rations are cached, but which I dared not visit, fearing denser fog would set in and delay seriously our northward passage. At 10 P.M. after running slow through a dense fog, it was necessary to stop until the next day (August 4th), when the fog clearing at 11.15 A.M., Lady Franklin Sound was sighted about 8 miles north-east (true). It was passed at 11.45 A.M. At 2 P.M. the ship stopped on the north-east end of Carl Ritter Bay, where I had decided to place a small depôt of provisions in case of a retreat southward in 1883. About 225 bread and meat rations were landed by a party under myself, which Lieutenant Kisingbury and Dr. Pavy accompanied. The depôt was made on the first bench from the sea, just north of a little creek in the extreme north-east part of the bay. About 7.45 P.M., off Cape Lieber, a heavy pack against the land was passed by a detour to the eastward. And at 9 P.M., August 4th, the vessel was stopped for the *first time by ice*, in the extreme south-east part of Lady Franklin Bay, only eight miles from destination. The pack was a very heavy one, and running from Cape Baird north-westward in a semicircle, reached the Greenland coast (where it touched the land) just south of Offley Island, near the mouth of Peterman's Fiord. The pack consisted of thick Polar ice, ranging from 20 to 50 feet in thickness, cemented together by harbour ice from two to five feet thick. It was impossible to do aught but wait. The vessel was tied to the pack off Cape Baird, and awaited a gale. On August 5th, I went ashore at Cape Lieber, with Lieutenant Lockwood, Dr. Pavy, and party to examine the ice from the cliffs. Lieutenant Lockwood erected a cairn on the highest peak. No other cairn could be seen on it or from it, nor on other peaks visited by Dr. Pavy and myself. Occasional lanes of water could be seen through the lifts of the fog-cloud which covered Hall Basin, but the main pack was firm and unchanged. On August 6th, the pack moving slightly, obliged the vessel to change its mooring place from time to time.

August 7th, the pack drove us out of Lady Franklin Bay, and during that day and the 8th we were gradually driven south. Probably 25 miles of ice in huge fields passed southwards of us during those two days. Every opportunity was improved to steam around such fields to keep head against the southerly current. On the evening of August 8th the steady north wind had forced the whole pack down towards

us, while the fields previously driven southward packed fast together formed a huge compact barrier stretching from Carl Ritter Bay across to Hans Island. But a mile or so of open water remained. A nip appeared most probable, and preparations were hastily made to unship screw and rudder. During the night matters improved somewhat, but during the 9th and 10th we were forced slowly south-west to within about five miles of Hans Island, having lost about 45 miles of latitude. About noon of the 10th the long desired south-west gale set in, accompanied by snow, starting the pack northward. The snow cleared the next morning, but the gale fortunately continued. Open water was visible on the west coast as far northward as could be seen. At 7.30 A.M. we ran rapidly northward, and about 1 P.M. again passed Cape Lieber, and at 2.40 P.M. had crossed Lady Franklin Bay. Either ice-foot or pack-ice jammed against the shore covered Watercourse Bay, but a narrow lane permitted the vessel to enter Discovery Harbour just inside Dutch Island, where harbour ice about 18 inches thick was found covering the whole harbour, as well as the western half of Lady Franklin Bay. The vessel forced her way about a quarter of a mile through ice of the character above mentioned, and then stopped pending my decision as to the locality of the station. While Lieutenant Lockwood was sent to examine Watercourse Bay and the coal-seam, I visited alone the *Discovery* winter quarters and found in a cairn two tin cases, one labelled "Records" and the other "General Information." They form enclosures "L, M, N, O, P," to this report. Lieutenant Lockwood, returning early morning August 13th, reported the place an excellent one for camp, the bay partly clear but shallow. He thought it probable the vessel could come within about 200 yards of the shore; the bay, however, was of such shape that, while discharging, the vessel would be unprotected against ice, as it is exposed to all winds from N.E. to S.S.W. The coal was so located that it could be readily mined after the ice forms, and could, if required, be hauled without difficulty to Watercourse Bay or to Discovery Harbour. I reluctantly decided to settle at Discovery winter quarters, owing to the uncertainty that would attend unloading at such a place.

It was fortunate that I so decided, for sending Dr. Pavy to ground overlooking Watercourse Bay, on August 13th, he reported it full of pack-ice. On the 12th, the vessel broke her way through two miles of heavy ice, and anchored off the cairn about 100 yards from shore at 3 P.M.

At 3.30 P.M. the men were divided into two gangs, to work day and night by four-hour reliefs until the cargo was discharged.

The general cargo was discharged in 60 hours by 3.30 A.M. (to-day) August 14th. At this time coal is being landed, of which I have about 140 tons, enough to last two winters, without mining any. Work on the house is progressing rapidly, though but three or four men can be spared at present for that work. The foundation has been finished, floor stringers laid, and about one-eighth of the frame is now up.

Fourteen musk oxen have been killed, and enough meat is on hand for issue three times a week for the coming seven months, besides 10 days' rations of dried birds. The post has been named Fort Conger, in honour of Senator Conger of Michigan. Anything of importance will be added as an appendix. Photographic views have been and will be taken once each day, from which you can best judge of the progress and condition of affairs. I feel it proper to here state that in my opinion, a retreat from here southward to Cape Sabine, in case no vessel reaches us in 1882 or 1883, will be safe and practicable, although all but the most important records will necessarily have to be abandoned. Abstracts could and would be made of those left.

I am, respectfully yours,

To the Chief Signal Officer of the Army.

A. W. GREELY.

REPORT OF THE EVENING MEETINGS, SESSION 1881-2.

Fifth Meeting, 30th January, 1882.—Sir RUTHERFORD ALCOCK, K.C.B.,
Vice-President, in the Chair.

PRESENTATIONS.—*Arthur C. Cork, Esq.; H. A. Erlebach, Esq.*

ELECTIONS.—*Major A. W. Baird, R.E.; Major H. Stephenson Clarke, R.A.; Howard Cundey, Esq.; Colonel William Davies, C.S.I.; John Henry Davis, Esq.; Robert I. Finnemore, Esq.; Warwick Arthur Green, Esq.; William L. Lang, Esq.; Harmon P. Read, Esq.; M. Elisée Reclus; Howard Spensley, Esq.*

The following papers were read:—

“Across Iceland by the Sprengisandr Route.” By Cuthbert E. Peek.

“Excursion to Askja, August 1881.” By E. Delmar Morgan.

For both papers and the discussion upon them, see *ante*, p. 129 *et seq.*

Sixth Meeting, 13th February, 1882.—The Right Hon. Lord ABERDARE,
President, in the Chair.

PRESENTATION.—*H. Grattan Guinness, Esq.*

ELECTIONS.—*Charles E. De Rance, Esq.; The Earl of Dysart; Pascoe Fenwick Esq.; A. J. Gayne, Esq.; J. Allen Jackson, Esq.; Hugh Thomas Munro, Esq.; Major Charles Wyndham Murray; John Alfred Pybus, Esq.; Colonel Francis Richard W. Sibthorp; Rev. Alfred Wild; Frederick Young, Esq.*

The subject of the evening was a lecture by Sir Richard Temple, Bart.—

“On the Geography of the Birthplace and Cradle of the Mahratta Power in Western India.”

Will be published, with map and pictorial illustrations, in a subsequent number of the ‘Proceedings.’

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—February 3rd, 1882: M. Henri Duveyrier, President of the Central Commission, in the Chair.—A letter from Capetown, dated January, 1882, was read confirming the news of the death of M. Henri Dufour, who appears to have been assassinated near Benguela. The natives suspected of the crime have been punished by the Portuguese authorities.—It was announced that news had been received of Dr. Jules Crevaux from Buenos Ayres down to December 23rd, 1881. By the advice of Dr. Zeballos, President of the Argentine Geographical Institute, the traveller had decided to undertake the exploration of the Rio Pilcomayo, an important affluent of the Paraguay, which traverses the little known regions of the Gran Chaco. As its entire course has not hitherto been traced by any geographer, its exploration will possess considerable geographical interest, from both a political and a commercial point of view, especially as Bolivia is desirous of finding an outlet for her rich produce down the Paraguay and La Plata to the Atlantic. Three republics, indeed—Bolivia, Paraguay, and the Argentine Confederation—are interested in this exploration of the Rio Pilcomayo. Dr. Crevaux was to start on December 24th for the sources of this river, which he will descend to its mouth: he has with him three companions—an astronomer, a painter, and another—in addition to an escort furnished by the Paraguayan and Bolivian Governments. Before going to Buenos Ayres, Dr. Crevaux visited Brazil, and he intends to return there in about three months’ time.—It was next announced that the Society having deemed it possible that there might exist in the mosques of Kairwan, the sacred city of Tunis, manuscript documents of geographical interest, inquiries were made, but the

General commanding at Kairwan, had replied that there only remained in the great mosque a few loose leaves, of no importance, and wholly unconnected with geography. M. Eduard Glaser, an Austrian archaeologist, had, however, discovered in private houses some ancient manuscripts, among which were three relating to geography and history. M. Duveyrier furnished the Meeting with some information with regard to these works, which date from the second, seventh, and eighth centuries of the Hegira. It was stated that further researches were about to be made into the matter by Professors Houdas and Basset, of Algiers, who had been sent to Kairwan for that purpose by the Minister of Public Instruction.—M. Léopold Hugo sent a note on a small bas-relief in the new Sarzec collection at the Louvre, which appeared to symbolise the two great rivers of Mesopotamia, the Tigris and the Euphrates.—Colonel Veniukof informed the Meeting that the survey of the country, between Askabad and Sarakhs had been completed, and that the geographical position of thirteen points between these two towns and Mash-had had been determined. He also called attention to the publication in the *Nouveau Temps* of an important work on Khorassan and the Kurds inhabiting the northern part of that province.—A letter was read from the French Consul at St. Petersburg, announcing the departure in December last of the expedition, organised by the Imperial Geographical Society, destined for the mouth of the Lena in conformity with the arrangements made at the International Polar Conference last summer.—A long communication was next read from MM. Bonvalot and Capus on the subject of their journey from Bokhara to Krasnovodsk, by way of Khiva and the Ust Urt plateau.—A series of photographs and drawings, arranged round the hall, were presented to the Society on behalf of Herr Friedrich von Schenck, of Gotha, who has returned from a second journey in South America. This traveller has been especially engaged in exploring the United States of Colombia, and he has corrected and is preparing a new map of the State of Antiochia. He has surveyed the course of the Magdalena above Honda, where the river ceases to be navigable. M. Pector, Consul-General for Salvador, gave the Meeting a rapid sketch of von Schenck's itinerary.—It was announced that MM. Renault and de Torcy had prepared a paper on their journey during the spring of last year in some unfrequented and little-known parts of Syria. This journey of over 1100 miles has furnished them with the materials for a route-map, on which they are now engaged, and they were especially careful in determining altitudes.—M. d'Abbadie announced the return to Italy of Captain Cecchi, who has visited the Eastern Gallas, and intends to give an account of his travels to the Society.—M. Ch. de Mosenthal, Consul-General of the Orange River Free State, communicated the results of the census of that country, taken on March 31st, 1880, and other statistical information. The number of the inhabitants was 133,518, the town of Bloemfontein containing 2567 souls. There were 5,505,301 merino sheep in the country, together with 426,535 Angora goats, 2253 ostriches, &c. Between June 1st, 1879, and February 1st, 1880, there were produced in the country 255,256 bushels of wheat, 161,857 lbs. of tobacco, 1102 lbs. of ostrich feathers, &c.—M. Barbié du Bocage read a paper on the different phases through which the forests of the northern temperate zone have passed since the most ancient period (to be published in the *Bulletin*); and Colonel Veniukof read some extracts from a paper on the unexplored regions of Asia, referring to some extent also to Europe. From his statements it appeared that a third of Asia still remains unexplored, and that a similar remark applies to a thirtieth part of Europe. In Asia there is much still to be done in the north of Siberia, Tibet, Turkistan, Indo-China, and Arabia.

Geographical Society of Bordeaux.—January 5th, 1882: Dr. AZAM, President of the South-Western Geographical Group, in the Chair.—Dr. Bayol, who had arrived from West Africa on the previous day, delivered an address on

his journey to the Futa Jallon highlands. He started from France on April 5th, 1881, and commenced his preparations at Dakar as rapidly as possible. On reaching the Rio Nunez, he found that the rains had set in, but his instructions being peremptory, he was obliged to form his escort at once of a heterogeneous collection of natives, most of whom had afterwards to be dismissed, and quitted Boké on May 17th. Here unfortunately M. Billet, the astronomer of the party, was obliged to go back, and shortly afterwards M. Moustier, who had been engaged as interpreter, declaring the project impracticable, was sent back to Senegal; M. Noirot, a photographer, alone remaining with Dr. Bayol. The expedition at once approached the basin of the Rio Congo, crossing an uninhabited tract of country, at the further side of which Umaru, the son of the Almany Hamadu, made an ineffectual attempt to stop them. The country afterwards traversed was very picturesque and fertile, abounding in maize, rice, cotton, oleaginous grains, and indiarubber; the cattle are magnificent, and are reared there in great numbers. Dr. Bayol stated that the climate of this region was well suited to Europeans, who might safely form trading establishments there. As soon as he got near the Almany, he had a preliminary visit from his envoy, Ahmadu Seydu, and here a difficulty presented itself. Futa Jallon has two elected chiefs, the Almany Ibrahima Sori, and the Almany Hamadu, his cousin, who has seized upon the power. Dr. Bayol, however, first went to visit the former, as being the older of the two, and the real chief of the country. Dr. Bayol explained to him the object of his mission, and requested that protection might be afforded to all persons of French nationality; he also expressed a wish that Futa Jallon might be thrown open to French commerce. Ibrahima Sori immediately acceded, and sent messengers to the Almany Hamadu at Timbo. On July 14th Dr. Bayol reached that town, where he found all the chiefs of the country assembled, and he had the good fortune to secure the signature of an important treaty. He wanted to proceed further into the country, but Ibrahima Sori dissuaded him, and wished to keep him at Damolféla, where he lived, in order to acquaint himself fully with the meaning of the treaty. Dr. Bayol fell ill, but was admirably cared for and speedily restored to health. On August 30th he started on his return journey, after having despatched M. Noirot to examine the sources of the Gambia and the Rio Grande. The expedition traversed the valley of the Bafing, and the Labé country, and at length arrived in the region of the Upper Gambia. On entering the country of the Malinkés, which the Almany had begged them to avoid, armed bands endeavoured to stop the expedition, but they succeeded in reaching Makakolo, the capital. This country is rich in gold, which is but little sought after, copper being held in higher esteem. Pursuing his journey, Dr. Bayol reached the banks of the Falémé, whence he proceeded by way of Sadiola and Medina to St. Louis.—M. Noirot, Dr. Bayol's companion, afterwards made some remarks on the character, manners, and customs of the peoples he had seen; and the principal envoy of the Almanys said a few words of thanks for the kind reception he and his companions had met with at Bordeaux.

— Annual General Meeting, January 23rd, 1882: Dr. AZAM, President of the South-Western Geographical Group, in the Chair.—The Chairman delivered an address, chiefly devoted to the labours of the various sections of the group, excluding the central one at Bordeaux. He mentioned at the outset that the South-Western Geographical Group now comprised eight sections:—Bordeaux, Périgueux, Bergerac, Mont de Marsan, La Rochelle, Agen, Blaye, and Tarbes, the total number of members amounting to nearly 1500, of whom 725 belong to the central section.—M. Marc Maurel, President of the Bordeaux Section, read a report on the work of his section from the point of view of the direct interests of the town, its industry, and its commerce.—M. Manès, General Secretary, afterwards gave an account of the

general work of the Bordeaux section.—It was then announced that the two principal silver medals of the Society had been awarded to Captain Gallieni for his geographical work on the Upper Niger, and to Dr. Bayol for his recent explorations in the Futa Jallon highlands of West Africa.—Lastly, M. Charles Gachet read a paper on his journey to the Tekke Turkoman country.

Geographical Society of Rome.—January 6th, 1882: Signor L. BODIO in the Chair.—Professor A. Bruniati read a paper on Italian emigration in general, and more particularly that to La Plata. Signor Bruniati remarked that it was necessary to distinguish two periods in Italian emigration, i. e. before and after the unification of the country; and that before this took place, there was no emigration properly so called, seeing that it was so fettered and even forbidden in the petty states of the peninsula, Piedmont alone furnishing a certain number of *bonâ fide* emigrants. During the second period, however, matters had materially changed in this respect. After referring to the nature of Italy's interests in various regions—the Levant, Africa, and La Plata—Signor Bruniati declared himself in favour of emigration under certain conditions. He then proceeded to deal with the second part of his paper, viz. the history of Italian emigration to the region of La Plata, in which he included the States of the Argentine Confederation, Paraguay, Uruguay, and the three southern provinces of Brazil. After the conclusion of the paper, Colonel Lucido Mansilla, an Argentine officer, made some observations in support of Signor Bruniati's statements, and Signor E. Gentili then pointed out the advantage which would accrue from the formation of a central committee at Rome, as well as sub-committees in the chief centres which would be most likely to furnish emigrants, in order to collect and supply the most information regarding fields for emigration.

Geographical Society of Cairo.—January 6th, 1882: General STONE-PASHA, President, in the Chair.—Colonel Chaillé Long, the discoverer of Lake Ibrahim, was nominated an Honorary Member of the Society.—Mahmud-Bey, Vice-President, read a paper in which he showed the necessity for the establishment of meteorological stations in Egypt in accordance with the resolutions passed at the International Geographical Congresses of Paris and Venice, so that observations could be made which would be useful for purposes of navigation, agriculture, and public health. He propounded a scheme for forming five stations at present,—three in Lower, and two in Upper Egypt, and sketched out the nature of the work that might be done. He afterwards developed a plan, by which he believed it would be possible, by the aid of thermometrical and barometrical observations taken in certain localities, to predict, with a considerable degree of accuracy, the probable height of the waters of the Nile.—After the reading of these communications, there was an animated discussion, in which the President, the General Secretary, M. Abbate, one of the Vice-Presidents, and others took part.

—February 3rd, 1882: General STONE-PASHA, President, in the Chair.—Among those present at the meeting, which was chiefly devoted to the reading of obituary notices of Dr. P. Matteucci and Signor Carlo Piaggia, were Dr. Schweinfurth, formerly President of the Society, M. Ferdinand de Lesseps, President of the Geographical Society of Paris, and Lord Houghton, one of the Trustees of the Royal Geographical Society.—The addresses delivered by Signor de Vecchi and Signor Figari, dealt in great detail with the journeys and services to geographical science of the two Italian travellers, one of whom died in London on his way home from Africa, while the other met his death in the midst of the African forests on the Blue Nile, when he was setting out to join Mr. J. M. Schuer in his journey of exploration to Eastern Africa. Dr. Schweinfurth afterwards made a speech, eulogising Signor Piaggia, and M. de Lesseps and Lord

Houghton added a few observations, and congratulated the Society on the homage so justly rendered to the two men who had fallen victims to their zeal in the service of science.—During the meeting the Chairman made a communication relative to the discovery of the gold-mine, of which so much has lately been said in Egypt, and the General Secretary presented a series of meteorological observations which had been taken at a private observatory during the month of January.

Geographical Society of the Pacific, San Francisco.—December 13th, 1881: Professor GEORGE DAVIDSON, President, in the Chair.—The Chairman introduced Captain C. L. Hooper, of the U.S. Revenue Marine, to the Society, and referred to the thorough work he had accomplished in 1880 and 1881 in the steamer *Corwin*, although a vessel not specially fitted out or adapted to Arctic exploration; he also expressed a hope that he might have further opportunities for utilising his experience.—The Chairman then read the paper which had been prepared by Captain Hooper on the recent cruise of the *Corwin* in the Arctic Seas. [The chief features of this voyage were described in the Royal Geographical Society's 'Proceedings' for December.*] Captain Hooper, in addition, gave many interesting details of his experiences. With regard to the habits of the Chukches, with whom he had a good deal to do, he mentioned that in winter they travel west on their way to the Russian trading posts in the interior, which they reach by ascending the rivers west of Cape Jakan; in the spring they travel to East Cape, cross Behring Strait, and continue their journey to Cape Blossom, Kotzebue Sound, where they meet the Eskimo from the entire coast of Arctic Alaska, from Point Barrow to Cape Prince of Wales, for purposes of trade, returning to their homes by the same route in the latter part of the summer. Several particulars respecting the manners and customs of these people were given. Captain Hooper then proceeded to relate that on the evening of July 26th, when steaming southward towards Cape Lisburne, the crew of the *Corwin* had an exhibition of the wonderful effects of the refraction of light in the Arctic Regions, the many fantastic forms assumed in the mirage by the whaler *Belvedere* being a source of amusement to all on board for several hours. As if to complete this remarkable exhibition, he added, about midnight a stratus cloud not more than 2° wide and 15° long appeared below the sun, which at this season approached within about 3° of the northern horizon. This cloud, acting as a prism, decomposed the rays of the sun's light, and produced between the horizon and the cloud a solar spectrum of great brilliancy and beauty, constantly changing in intensity owing to the change in position of the cloud—at times showing all the colours of the rainbow, at others only one or two, dying out completely only to reappear by running through all the colours successively—violet, indigo, blue, green, yellow, orange, red—each showing but a second of time, and giving place to the next as if by magic. This beautiful display lasted about half an hour.—Captain Hooper afterwards enumerated the plants collected, and the species of sea-fowl and the various mammals observed near Wrangell Island; among the last being a small species of hair-seal unknown upon the American coast, and perhaps new to science.—During the cruises of the *Corwin* in the Arctic Seas in 1880–1, observations on the currents were made whenever practicable. The force and direction of the surface and bottom currents were measured, but the subject being one of great interest and importance, and involving a comprehensive discussion of all the circumstances of wind, weather, ice, &c., Captain Hooper had determined to deal with it in a separate paper. From his observations during the past two seasons, from the testimony of the whalers, and from such information as he could gather from the natives and other sources, Captain Hooper is of opinion that a branch of the Kuro-Siwo, or Japanese warm stream, passes through Behring Strait, but subject to the varying conditions of

* See vol. iii. p. 731.

wind and ice. A southerly wind accelerates it, while a northerly wind stops it entirely for a time; and in some cases of a long-continued northerly wind, it is not impossible that a slight southerly set may be created, but such an occurrence, Captain Hooper said, must be rare and of short duration. The current is much stronger in August and September than in the early part of the season, when the ice-pack extends entirely across the Behring Sea. This branch of the Kuro-Siwo follows the direction of the Kamchatka coast to the northward through Behring Sea, passing between St. Lawrence Island and the coast of Asia, and thence through the strait, after which it is controlled in a great measure by the condition of the ice-pack. Captain Hooper stated that he had never known the current through the strait to exceed three knots per hour, the average being probably not more than two knots. Near Herald and Wrangell Islands the current was found setting to the north and eastward about two knots per hour, and no tidal change was detected; off the south coast of Wrangell Island a slight westerly current was observed. In the Arctic, as well as in the Behring Sea, there is, no doubt, a tidal current, but it is so dependent on the conditions of the ice, that only the mean of a long series of careful observations could determine its characteristics.—Appended to Captain Hooper's paper was a table showing his determination of the magnetic declination and dip in the Arctic regions from May 30th to October 3rd, 1881.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

ASIA.

Godinho de Eredia.—Malaca, L'Inde Méridionale et le Cathay. Manuscrit Original Autographe de Godinho de Eredia, appartenant à la Bibliothèque Royale de Bruxelles, reproduit en fac-simile et traduit par M. Léon Janssen . . . avec une préface de M. Ch. Ruelens. Bruxelles (C. Muquardt): 1882, 4to., pp. xiv., 81, 100, maps, plates, &c. (*Dulau*: price 1*l.* 12*s.*)

The Brussels 1613 MS. of Emanuel Godinho de Eredia, which M. Ruelens first made known at the Antwerp Geographical Congress, is here printed, with the maps, plates, smaller illustrations, title, index, and some pages of the MS. itself in facsimile (even to ink colour): 120 copies only have been struck off, and of these but 30 are to be sold. To this are added a facsimile of the copy map referring to Godinho's supposed discovery of Australia, found by Mr. Major (who has, happily, only retired from office and not from life, as erroneously inferred by Mr. Janssen) in the British Museum collection in 1861, and engraved in 'Prince Henry the Navigator'; the facsimile of a letter by Eredia belonging to the Lisbon Archives; and a translation of the Brussels MS. and of the last-mentioned letter.

Mr. Ruelens in the preface discusses the various opinions as to the identity or otherwise of Australia with the "India meridional" or "Luca Antara" of Eredia. This is the "Nuca Antara" of Mr. Major's map, which is thereon stated to have been discovered by Eredia in 1601. The MS. now printed, however, shows that Eredia was appointed Adelantado of these still undiscovered regions in that year, and that he was himself prevented by a war between the Dutch and Malays from leaving Malacca; and their actual discovery (whether they represent merely Sandalwood Island, or Australia) is claimed to have been made by a shipwrecked chief Chiaymasiuro. Apart from the interest which must necessarily attach from the historical point of view to all evidence, however apparently unsatisfactory, upon such an important subject, this reproduction contains much material of value upon the ancient geography (and in parts the topography) of Ceylon, and the Malayan Peninsula and Archipelago, also in

more general terms of China, the Hindostan Peninsula, Turkistan, and Central Asia. The reproduced maps of the district of Malacca, Sumatra, Ceylon, the Nile delta, various islands of the Malayan Archipelago and portions of the modern Straits Settlements, the plans of the forts and city of Malacca, portraits of the Viceroy Francisco de Gama and Ayres de Saldanha, Albuquerque, and Eredia himself, and the occasional representations of such local objects as the durian and mangosteen, are of especial interest, which is increased in the case of some of the maps and plans by reproductions of still more ancient representations for the sake of comparison by Eredia. Various maps of the whole region are also reproduced, with one general elliptical world projection, in which vast early Antarctic discoveries by the Portuguese are depicted, besides the "India Meridionalis."

Merrill, Selah.—East of the Jordan; a Record of Travel and Observation in the Countries of Moab, Gilead, and Bashan. With an Introduction by Professor Roswell D. Hitchcock. London (Bentley & Son): 1881, 8vo., pp. 549, map, illustrations. Price 16s.

Mr. Merrill was Archaeologist of the American Palestine Society, whose explorations he conducted in 1875-77, under the immediate direction of the Advisory Committee in Beirut. The present volume is written in a popular manner, with personal incidents; the results of the work are promised in 'Topographical Notes on Eastern Palestine' from his pen, of which the publication is withheld for the present, but which should far exceed the bulk of this book, as the area embraced by the proposed survey is 6000 square miles, about the size of our own survey in Western Palestine.

Information and illustrations from well-known authorities are freely incorporated with the original matter, a large amount of which is claimed to be wholly new, many of the plates, &c., being also from the author's own drawings.

A list of authorities consulted is added. The map is a mere skeleton.

AFRICA.

Barclay, Edgar.—Mountain Life in Algeria. London (Kegan Paul, Trench, & Co.): 1882, squ. 8vo., pp. xviii. and 119, illustrations. Price 16s.

Chiefly noticeable for the excellence of the illustrations, which are mostly reproduced by photography. The author describes his experiences in Kabylia, with special reference to the native customs, &c.

Beltrame, G.—Il Fiume Bianco e i Dénka. Verona (Drucker & Tedeschi): 1881, 12mo., pp. 323, map. (*Dulau*: price 3s. 6d.)

This continuation of the reverend author's previous work 'Il Sennaar e lo Sciangallah' was published by the Royal Venetian Institute of Sciences, &c., on the occasion of the International Geographical Congress at Venice, and in addition to some linguistic specialities contains the account of his missionary experiences in 1859 and 1860 in the upper basin of the White Nile as far as Lado. The map (scale 1:3,000,000) includes from Fashoda to above Gondokoro.

Olivier, Aimé, Vicomte de Sanderval.—De l'Atlantique au Niger, par le Foutah-Djallon. Carnet de Voyage. Paris (Ducrocq): 1882, large 8vo., pp. x. and 407, map, illustrations, no Index. (*Dulau*: price 5s. 3d.)

The author, having organised an expedition at his own cost, started at the end of 1879 with the object of exploring the Futa-Jallon highlands south of the Gambia, hitherto chiefly known from the travels of his fellow-countryman Lambert in 1860. His intention was to discover the point of the coast which could most usefully be connected by a railroad with the navigable waters of the upper Niger; then to reach the plateau of Futa-Jallon (or Timbo) and obtain the written permission of its then ruler Ibrahim Saury to construct a rail across his territory; and finally to strike the Niger near its Tankisso feeder, and descend the

river to Sokoto with the object of studying the South-Western Sudan. He only succeeded in reaching Timbo, but the journey convinced him that this was the shortest road for his project, and that it was entirely in a healthy country, inhabited by well-disposed people. After a detention of two months at Timbo, he obtained the formal authority above referred to in June 1880, and immediately returned as expeditiously as might be to France, where he reorganised another expedition, consisting of Messrs. Gaboriaud, De Fontenay, and Ansaldi, who reached Timbo at the end of June 1881, and obtained the sanction of Amadou (who had in the meantime succeeded Ibrahim Saury as chief) to the permission before obtained. The text of this document, as translated, contains an article of considerable commercial importance, even supposing the idea of a railroad to be impracticable, viz. a concession of the right of establishing factories and trading settlements free of taxes or duties.

After visiting various islands in the Bissagos archipelago (of whose inhabitants and their customs he gives some details), touching at Bissao and Bulama, sailing up the mouth of the Tambaly, and making other coasting trips with the object of discovering the best terminus for the projected railroad, the author commenced his journey into the interior by ascending the Rio Grande as far as the Buba factories. Thence he struck across a wooded country south of the river, crossing its Fifiñi affluent and continuing south-east and east along and across the head waters of the Cassini and further on of the Rio Grande, following the valley of Cohara to Burumba, the eastern limit of the Rio Grande catchment area, and crossing south-east to the complex system which supplies the Kakriman, Faleme, &c., finally reaching Timbo by Fugumba. He returned by a more southern route after Fugumba through Madina, reaching the coast by the Rio Nuñez. His experiences (not unfrequently of the romantic nature apparently inevitable with some French explorers) are told in diary form, with illustrations of personal incidents and scenery, mostly trivial, though some of the smaller cuts (like some of the author's less pretentious notes) will probably be found of value.

An itinerary of the journey to and from Timbo is given, with a good map in colours (scale 1:1,250,000), vertical sections of both routes, and an inset of North-Western Africa showing proposed lines of railroad.

Wilson, [Rev.] C. T., and Felkin, R. W.—Uganda and the Egyptian Soudan. London (Sampson Low & Co.): 1882, 2 vols. cr. 8vo., pp. 372 and 379, maps, illustrations. Price 17. 8s.

Mr. Wilson, it will be remembered, was the survivor of the party sent by the Church Missionary Society to Mtesa's country in 1876 in consequence of Mr. H. M. Stanley's appeal for religious aid in Uganda, of whom Dr. Smith died on the southern shores of the Victoria Lake, and Mr. O'Neill and Lieutenant Shergold Smith were killed by natives at Ukerewe. He was joined early in 1879 by his present collaborateur, who reached Uganda with other missionaries by the Nile route; and returned with him by the same route to Europe in order to take charge of the envoys sent by Mtesa to this country. These volumes are not intended to be an account of the Mission, but to be descriptive of the countries visited, especially of Uganda, where Mr. Wilson resided for two years; the first of them is by him, with the exception of the chapters on the manners and customs of the Waganda, in which Mr. Felkin assisted; the second volume is by the latter, with some slight help from Mr. Wilson. The main features of both volumes were given in our 'Proceedings' for June 1880, by both writers.

Vol. I., in addition to the description of Uganda and its people, with their government and language, describes the journeys from Bagamoyo to Mpwapa, Ugogo and Iramba to Ng'uru, Ng'uru to Kagei and Ukerewe, Kagei to Tabora, &c., and Mr. Felkin's narrative of his journey to the Lake, from Suakim to Rubaga. Various appendices contain a discussion of Central African trade, the plants collected, and the Itinerary of the journey from Bagamoyo to Kagei, by Mr. Wilson; Vocabularies of the Luganda, Fur, Madi, and Kederu languages; and the Meteorological and Hypsometrical observations of both the travellers, by Mr. E. G. Ravenstein.

Vol. II. continues Mr. Felkin's narrative, describing the return route from Rubaga to Foweira and Lado, and thence round the south-western Sudan by Jur Ghattas, Dem Idris, Dem Suleiman, Dara and Obeid, to the Nile again, and home via Khartum, Berber, and Suakim. The Appendices to this volume contain anthropological notes and measurements, with a table of the principal Indices; also itineraries of the journeys from Suakim to Rubaga and back via Dara, all by Mr. Felkin. To these are added an analysis of iron ore from Madi and Darfur by Dr. R. Caspari, and a Report on water from the hot spring at Busi, by Mr. A. W. Gerrard.

The maps are (1) a sketch of former and existing conditions of the Albert Lake, scale 1 : 2,516,231; (2) route from Tabora to Kagei, scale 1 : 1,495,990; (3) Rubaga to Mruli, scale 1 : 8,706,160; (4) the route from Lado to Dara, scale 1 : 14,513,452, with inset of the whole region covered by the books.

The engravings are either from drawings by the travellers or from photographs taken by Herr R. Buchta.

AMERICA.

Bryce [Rev. Professor].—*Manitoba: its Infancy, Growth, and Present Condition.* London (Sampson Low & Co.): 1882, cr. 8vo., pp. 367, map, illustrations. Price 7s. 6d.

Chiefly of historical interest, the writer (who has long been concerned with the educational and social improvement of the Canadian North-West) having collected together records of the Hudson's Bay Territory, Rupert's Land, Assiniboin, Red River Settlement, and Selkirk Colony, now included under the name Manitoba, and frankly avowing his object to reinstate the name of the late Earl of Selkirk as a coloniser.

The map is of British North America on a small scale, and there is a plan of Winnipeg as now existing. A list of works consulted completes the work, which has no Index.

GENERAL.

Helms, Ludvig Verner.—*Pioneering in the Far East, and Journeys to California in 1849, and to the White Sea in 1878.* London (W. H. Allen & Co.): 1882, 8vo., pp. 408, maps, illustrations. Price 18s.

The author went to the Straits Settlements in 1846, and describes in a somewhat promiscuous fashion his impressions of the Island of Bali (including a detailed account of a peculiar form of suttee which he witnessed in the following year); of San Francisco in 1850, Cambodia and Siam, Borneo from 1851 to 1872, China, Japan, and California again, and the White Sea. In the last section, the account of the examination of the mines in Bear Island, Kandalaks Bay, is of some interest; but the portion of the book referring to Borneo (or rather to Sarawak) contains the most useful material, historical and descriptive, including an account of the Chinese insurrection in 1857, and a discussion of the succession to the Regency. Some few details are also given of the minerals in Sarawak. The illustrations are very unequal; the maps of Borneo and Sarawak are practically the same as those given in our 'Proceedings' for April 1881, appended to the paper by Mr. W. M. Crocker, who acknowledges the author's aid as regards the Sarawak river and the upper district.

NEW MAPS.

(By J. COLES, *Map Ourator* R.G.S.)

EUROPE.

Austrian Government.—Specialkarte der Oesterreichisch-Ungarischen Monarchie. Scale 1:75,000 or 1 geographical mile to an inch. K. k. militär. geographisches Institut, Wien, 1882. Price of each sheet 1s. 4d. (*Dulau.*)

The following sheets are just published:—Zone 2. Col. XI. Rumburg und Warnsdorf. Col. XII. Reichenberg u. Friedland. Zone 3. Col. VIII. Sebastiansberg und sächs Annaberg. Col. IX. Brüx, Dux und Teplitz. Zone 4. Col. VII. Graslitz und Johannegeorgenstadt. Col. X. Raudnitz und Jungfernteinitz. Zone 5. Col. X. Kladno und Schlan. Zone 6. Col. VII. Marienbad und Tachau. Col. XII. Kuttentberg und Kohl-Janowitz. Zone 7. Col. VII. Pfräumberg. Col. XII. Ledec und Wlaschim. Col. XIV. Policka und Neustadt. Zone 8. Col. VII. Klentsch. Zone 9. Col. XII. Neuhaus. Zone 16. Col. XI. St. Johann am Tauern. Zone 17. Col. XI. Judenburg. Col. XII. Köflach und Voitsberg. Col. XIII. Graz. Col. XIV. Fürstenfeld. Zone 18. Col. XII. D. Landsberg und Wolfsberg. Col. XIII. Wildon und Leibnitz. Zone 19. Col. XII. Unt. Drauburg. Col. XIV. Radkersburg und Luttenberg. Zone 21. Col. XII. Cilli und Ratschach. Zone 22. Col. X. Haidenschaft und Adelsberg. Col. XII. Wixelburg und Zirknitz. Zone 23. Col. XI. Laas und Cabar.

Prussian Government.—Karte des Deutschen Reiches. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—79 Eider Mündung, 80 Heide, 111 Otterndorf, 361 Nordhausen, 463 Geisa. Herausgegeben von der Kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1882. (*Dulau.*)

Trampler, R.—Eisenbahnkarte der oesterreichisch-ungarischen Monarchie. Scale 1:440,000 or 61·1 geographical miles to an inch. Wien, Hof u. Staatsdruckerei. Price 1s. (*Dulau.*)

ASIA.

Indian Government Surveys:—Triangulation Charts: Preliminary Chart of the Madras Coast Series. Season 1879–80 (including Madras and Pondicherry). With Negapatam Minor Series, 1879–80. Scale 4 miles to 1 inch. With letterpress.—Indian Atlas: Quarter sheet 53 S.W. Parts of Hoshangabad and Nimar, in the Central Provinces; and of Indore, Bhopal, Dewas, and Dhar, in the Central India Agency. Quarter sheet 69 S.W. Parts of Jhansi and Hamirpur Districts, in the North-West Provinces; and of Gwalior, Tehree [Tehri], and Dattia [Datia], Native States in the Central India Agency. Quarter sheet 129 N.E. Parts of Lakhimpur, in Assam; and of the Miri and Mishmi Hills, in the Himalaya Mountains. Quarter sheet 129 N.W. Part of the Miri Hills. Quarter sheet 129 S.W. Part of Lakhimpur and Sibsaigar, and the Daphla Hills.—Bengal Presidency: Bengal Lower Provinces: District Hazaribagh. 1868–71. Scale 4 miles to 1 inch; size 30 inches by 40.—Portion of the Government Reserve for Cinchona, the Sitong Block (in Darjeeling). Surveyed 1879–80. Scale 8 inches to 1 mile. On two sheets; size of each 25 inches by 40.—Map of Hopetown, Darjeeling District. Surveyed during 1878–9 and 1880–1. Scale 4 inches to 1 mile; size 40 inches by 27.—North-West Provinces and Oudh: North-West Provinces Survey. District Saharanpur. Sheet No. 14. Scale 1 mile to 1 inch.—Oudh Revenue Survey. Sheet No. 100. District Kheri. New edition, 1881. Sheet No. 130. Districts Bahraich and Kheri. New edition,

1881.—Punjab: Simla District, Simla, and Kalka Road. Cantonment of Dagshai. 1880–81. Scale 24 inches to 1 mile. On 5 sheets; size of each 40 inches by 27. Cantonment of Jutogh. 1880–81. Scale 24 inches to 1 mile; size 40 inches by 27. Cantonment of Solon. 1880–81. Scale 24 inches to 1 mile; size 40 inches by 27. Cantonment of Subathu. 1877–78. Scale 24 inches to 1 mile. On 3 sheets; size of each 40 inches by 27.—Index to the Sheets of the Simla and Kalka Road Survey, showing the situation and extent of the foregoing Cantonments.—Hazara District: Huttet Camp, Changla Gali, District Hazara. Surveyed Season 1880–81. Scale 12 inches to 1 mile, or 440 feet to 1 inch; size 26 inches by 34.—Kohat District: Index to the Sheets of the Topographical Survey, District Kohat. Size 9 inches by 13. Portion of Lower Meranzai. Season 1880–81. Scale 1 mile to 1 inch. Survey of Upper Meranzai. Season 1880–81. Scale 1 mile to 1 inch.—Bannu and Dera Ismail Khan Districts: Districts Bannu and Dera Ismail Khan. Seasons 1874–78. Scale 1 mile to 1 inch. Sheets 5, 6, 7, 13, 21.—Central Provinces: Central Provinces Topographical Survey. Seasons 1867–68–69. Sheet 9. Second edition. Part of Betul. Scale 1 mile to 1 inch; size 27 inches by 40.—Mysore: Mysore Topographical Survey. Season 1879–80. Sheets 22, 50. Scale 1 inch to 1 mile.—The Nundydroog State Forest, Chik Ballapur Taluk, Kolar District, Nundydroog Division, Mysore. 1879. Scale 4 inches to 1 mile; size 26 inches by 34.—Bombay Presidency: Deccan and Konkan Topographical Survey. Sheets 18, 22. Parts of Poona, Thana, and Ahmednagar. Scale 1 inch to 1 mile. Guzerat [Gujarat]. Season 1879–80. Scale 2 inches to 1 mile:—Sheet 16, Sections 1 and 2. Parts of Surat Collectorate. Joint Section, Sheets 5 and 24. Part of Ahmedabad Collectorate. Guzerat [Gujarat] (Dang Forests). Section No. 2 of Sheet No. 50. Pimpri, Amala, and Vasurna. Section No. 4 of Sheet No. 50. Vasurna.—Trans-Frontier Surveys. —Part of Southern Afghanistan with the adjoining portion of Baluchistan. Scale 1 inch to 4 miles. Compiled in the Surveyor-General's Office, Calcutta, from surveys and reconnaissances mostly by Officers of the Survey of India attached to the Southern Afghanistan Field Force, 1878–79–80. 4 sheets.—Northern Waziristan and the Dawar Valley. Surveyed during the expedition of April and May 1881, by Lieutenant Hon. M. G. Talbot, R.E., and Imam Bakhsh Bozdar. Traced by Lieutenant Talbot. Scale 2 miles to 1 inch.—Part of the Mahsud Waziri Country, showing the route taken by Brigadier-General Kennedy's column, April and May 1881. Surveyed by Captain Gerald Martin. Scale 2 miles to 1 inch.—Map of Quetta and the Upper Bolan. Season 1880–81. Biluchistan Topographical Survey. Scale 2 miles to 1 inch; size 40 inches by 27.—Map of Sibi and the Lower Bolan. Season 1879–80. Scale 2 miles to 1 inch; size 40 inches by 27. (*Stanford, agent.*)

NOTE.—The names in brackets [] are authorised spellings.

Palestine Exploration Fund.—Map of Western Palestine from surveys conducted for the Committee of the Palestine Exploration Fund by Lieutenants C. R. Conder and H. H. Kitchener, R.E.; reduced from the one-inch map, scale 1 : 168,960 or 2·3 geographical miles to an inch. Special Edition illustrating the divisions of the Natural Drainage and Mountain Ranges, according to "An Introduction to the Survey of Western Palestine," by Trelawney Saunders. (*Stanford.*)

Petermann's 'Geographische Mittheilungen.'—Wrangel-Land und die Kurse der Amerikanischen Dampfer "Corwin" und "Rodgers" 1880 u. 1881. Gezeichnet von B. Hassenstein. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 2. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Bamberg, K.—Wandkarte von Afrika. Scale 1:5,300,000 or 70·8 geographical miles to an inch. 9 sheets, chromolith. Weimar. Price 12s. (*Dulau.*)

De Bissy, Régnauld de Lannoy.—Carte d'Afrique. Scale 1:2,000,000 or 27 geographical miles to an inch. Dressé et dessiné par le Cap^{me} du Génie, Régnauld de Lannoy de Bissy. Publié par le Dépôt de la Guerre, Paris, en 1882. Sheets, 54, 58, 59, 60.

These are 4 sheets of the new map of Africa which is in course of publication by the Dépôt de la Guerre, under the superintendence of Capitaine du Génie Régnauld de Lannoy de Bissy. It is an outline map, no hills being shown, but all railways, roads, rivers, springs, and mission stations are given, and this portion of the map has evidently been compiled with great care, and brought up to a late date. On sheet 59 there are tables explaining the meaning of terms and abbreviations.

Intelligence Department, War Office.—General Map of the Mediterranean Sea and Northern Africa. Scale 1:3,500,000 or 47·6 geographical miles to an inch. Lithographed at the Intelligence Department, War Office, Nov. 1881.

Kiepert, Richard.—Vorläufige Übersicht von Dr. Max Buchner's Reise in Lunda, 1878–81. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Redigirt v. Richard Kiepert. Sitzung der Ges. f. Erdk. zu Berlin v. 4 Febr. 1882. (*Dulau.*)

This map shows very clearly the river system of the country traversed by Dr. Max Buchner between Malango and Mussumba. The southern route followed by Dr. Buchner is nearly the same as that travelled by Dr. Pogge until within a few miles of Kimbundu, where instead of turning to the south-east, as Dr. Pogge had done, he travelled in a nearly direct line to Mussumba. The three short journeys made by Dr. Buchner from the capital of Mustayanvo directly into the interior are not shown, and it therefore seems probable that they were of no great extent; the chief interest in this map, however, is centred in the return route. After crossing the Luisu, Lulua, and Kahunguige rivers, Dr. Buchner turned to the north until he reached the boundary of the Tukongo country, and crossed the Kassai river in lat. 8° S.; from this place the track marked on the map indicates an unsuccessful attempt to reach the town of Kiluasa, in the Turruba country, and then by way of Kahungula to a point on the Loange river, where his route, which had hitherto always had a northerly tendency, turned to the south-west, and passing through Feira de Kassange and Sanza, came to Malange; the routes from this latter place to the coast are well known and frequently traversed by traders. In his journey from Mussumba to Kassange, Dr. Buchner had to cross no less than twenty-two large rivers, besides minor streams. The whole distance between the two points (as the bird flies) is 380 geographical miles, and this will give some idea of the network of rivers by which the whole of this country is covered.

Petermann's 'Geographische Mittheilungen.'—Geologische Karte von West-Afrika. Nach seinen in den Jahren 1874–1877 und 1879–81 unternommenen Reisen entworfen von Dr. Oscar Lenz. Scale 1:12,500,000 or 171·2 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 1. Justus Perthes, Gotha. (*Dulau.*)

— St. Vincent Erskine's Erforschung des Gasa-Landes in Süd-Afrika in den Jahren 1872 bis 1875. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 4. Justus Perthes, Gotha. (*Dulau.*)

Ravenstein, E. G.—Sketch Map of the Cunene Basin and of the Upper Okavango, compiled for the Earl of Mayo by E. G. Ravenstein, F.R.G.S., Jan. 1882. Scale 1:1,500,000 or 20·4 geographical miles to an inch.

AMERICA.

Brackebusch & Seelstrang, Drs.—Skizze eines Theils der Sierra de Cordoba. Nach trigonometrischen Aufnahmen von Dr. Brackebusch und Dr. Seelstrang in Cordoba. Scale 1:500,000 or 6·8 geographical miles to an inch. Zeitschr. des für Erdk. Bd. XVII. Taf. 1. D. Reimer, Berlin. (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Patagonien. Übersicht der neuesten Forschungsreisen und der chilenisch-argentinischen Grenze vom 23 Juli 1881. Gezeichnet von O. Koffmahn. Scale 1:7,500,000 or 102·7 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 3. Justus Perthes, Gotha. (*Dulau.*)

Rand, McNally, & Co.—Indexed County and Township Map of Pennsylvania, with a new and original compilation and Index designating all Post Office Towns and Railroad Stations, and giving full Postal directions for sending mail matter to every place not a Post Office, in the State, known in the Post Office Department as "Locals"; also, an Alphabetically arranged List of all Railroads in the State (with the name of the Express Company doing business over each); also, of the Counties, Lakes, Rivers, etc., etc. Scale 1:520,000 or 7·1 geographical miles to an inch. Rand, McNally, & Co., Chicago. (*Trübner & Co.*)

OCEANIA.

Kiepert, H.—Physikalische Wandkarten. Der Grosse Ocean (Australien und Polynesien). D. Reimer, Berlin. 8 sheets. Price 12s. (*Dulau.*)

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in July, August, September, October, November, and December 1881:—

No.	Inches.		
2696	m	= 12·0	England, Isle of Man:—Douglas bay. Price 1s. 6d.
25	m	= 1·0	Australia, south coast:—Backstairs passage. Price 1s. 6d.
2655	m	= 3·95	Japan:—Simoda harbour. Price 1s. 6d.
200	m	= 0·24	Adriatic sea:—Ortona to the river Po, including the entrance of the gulf of Quarnero, on the Austrian coast. (Plans, Ortona. Port Fano. Port Pesaro. Rimini. Port Corsini.) Price 2s. 6d.
228	m	= 2·3	Black sea, Krimea:—Bolbek river to cape Khersonese, including Sevastopol harbour. Price 1s.
889	m	= 0·4	South America, east coast:—Touro to Formosa. Price 2s.
280	m	= 0·64	Newfoundland, east coast:—Notre Dame bay. (Plans, Paquet harbour. La Scie harbour. Approaches to Nippers harbours.) Price 2s. 6d.
522	m	= 6·0	South America, east coast:—Egg harbour or port San Antonio, with Gill Bay and The Oven. Tova island anchorages. Price 1s. 6d.
2160	m	= 0·15	China sea:—Carimata strait. Price 2s. 6d.
876	m	= 0·48	China sea:—Hainan strait. Price 2s. 6d.
1413	m	= 4·0	England, west coast:—Holyhead bay. Price 2s. 6d.
2011	m	= 12·1	England, west coast:—Holyhead harbour. Price 2s. 6d.
870	m	= 1·0	Baltic sea:—Wormso sound. Price 1s. 6d.
449	d	= 1·2	Mediterranean sea. Price 3s.
58	m	= 2·0	Mediterranean, gulf of Iskanderún:—Ayas bay or Mortalik. Price 1s.

No.		Inches.		
2665	m	= 0.05	China sea, southern portion.	Price 2s. 6d.
2657	m	= 0.75	Japan:—Gulf of Tokio or Yedo. (Plan, Yokohama bay.)	Price 2s. 6d.
2006	m	= 4.7	Scotland, west coast:—River Clyde from Greenock to Dumbarton.	Price 2s. 6d.
884	m	= 4.1	Marmara sea:—Artaki bay.	Price 1s. 6d.
2660a	m	= 0.05	China:—China sea, southern portion—western sheet.	Price 2s. 6d.
247	m	= 4.0	India, west coast:—Jaygad or Jyghur and entrance to Shastri river.	Price 1s. 6d.
2293	m	= various.	North America, west coast:—Plans in the gulf of California—Sta. Teresa bay. Sta. Maria cove. La Paz harbour. Estero de Agiabampo, entrance. Culiacan river, entrance.	Price 1s. 6d.
1059	m	= 0.12	Australia, south coast:—Doubtful island bay to the head of the Great Australian Bight.	Price 2s. 6d.
458	m	= 0.5	Africa, east coast:—Mafia island and channels.	Price 1s. 6d.
2866	m	= {1.78 6.0 }	North America, east coast:—Winyah bay and Georgetown harbour.	Price 1s. 6d.
457	m	= 1.9	Japan:—Aburatani harbour.	Price 1s.

1963, plan added, Owick bay. 1962, plan added, Goat island anchorage. 1999, plan added, Lyttelton harbour. 1802, plan added, Entrance to the Kourou river. 1760, plan added, Tingtae anchorage. 133, plan added, Assizes harbour. 2400, plan added, Black cliff or Losing island. 738, plans added, Port Chaul, Port Dabhol. 2530, plans added, Año Nuevo, San Simeon, Santa Cruz, Coxo, harbours. San Luis Obispo bay, Santa Monica. 2727, plan added, St. Paul island. 9363, plans added, Port Moueo, Muendu bay. 1392, plans added, Port Arthur. 944, plan added, Port Talindac. 2761, plans added, Silaubo Laubo, South Pajeh island, anchorages. 21, plan added, Parvenir bay. 2533, plan added, Newhaven harbour. 1278, plan added, Iquique road. (*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
2696	Douglas bay	New plan, Douglas bay	2696
2655	Simoda harbour	New plan, Simoda harbour	2655
200	Fossaceca to Rimino	New chart, Ortona to the river Po	200
1880	Ancona		
1678	Rimino, Pesaro, &c.		
228	Sevastopol harbour	New plan, Belbek river to cape Khersonese	228
889	Touro to Formosa	New chart, Touro to Formosa	889
280	Fogo island to Partridge point	New chart, Notre Dame bay	280
282	Paquet harbour		
283	La Scie harbour		
284	Nipper harbour		
552	Leones or Ship isle, and harbour	New plan, Egg harbour or port San Antonio, Tova island anchorages	552
2160	Carimata strait	New chart, Carimata strait	2160
1413	Holyhead bay	New plan, Holyhead bay	1413
2011	Holyhead harbour	New plan, Holyhead harbour	2011
55	Anjenwil harbour	Plan of port Dabhol on	738
304	St. Paul island	Plan of St. Paul island on	2727
2660b	China sea, southern portion	New chart, China sea, southern portion	2660b
2657	Gulf of Yedo	New chart, gulf of Tokio or Yedo	2657

No.		Cancelled by	No.
2006	River Clyde from Greenock to Dumbarton	New plan, river Clyde from Greenock to Dumbarton ..	2006
884	Artaki bay	New plan, Artaki bay	884
2660a	China sea, southern portion ..	New chart, China sea, southern portion	2660a
2293	Ports in the gulf of California ..	New plan, ports in the gulf of California	2293
1059	East Mount Barren to cape Pasley	New chart, Doubtful island bay to the head of the Great Australian Bight	1059
1060	Cape Arid to Australian Bight ..	New plan, Iquique road on ..	1278
1340	Plan of Iquique road on this sheet		
97	Hui-ling-san harbour		
98	Namo harbour	Plans placed on	2212
1022	Shitoe harbour		
1246	Hainan island to Macao	Additions to	2212
2866	Winyah bay and Georgetown harbour	New plan, Winyah bay and Georgetown harbour	2866
457	Aburatani harbour	New plan, Aburatani harbour ..	457

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1199, China:—Hieshan islands to the Yang-tse-Kiang. 2695, China, Yang-tse-Kiang:—Tung-liu to Hankau. 1237, Ireland, east coast:—Lough Larne. 2678, China, Yang-tse-Kiang:—Nanking to Tung-liu. 2691, Pacific ocean:—Fiji islands. 375, Labrador:—Sandwich bay to Nain. 933, Java, north coast:—Batavia road. 84, Bay of Bengal:—Chittagong or Kornafooles river. 2137, Eastern archipelago:—Gaspar strait. 428, West Indies, Cuba:—Cabanico and Livisa. 486, West Indies:—Jamaica and Pedro bank. 2249, Mediterranean, Malta:—Valetta to Marsa Scirocco. 811, China:—Anchorages between Black head and Crab point. 40, India, west coast:—Karachi harbour. 89, Portugal:—Tagus river entrance. 1853, South America, west coast:—Callao. 2118, Arctic sea discoveries. 133, Labrador:—Camp islands to Mecklenburgh harbour. 1480, China:—Yang-tse-Kiang. 2149, Eastern archipelago:—Banka and Gaspar straits. 1415, Ireland, east coast:—Dublin bay. 4, Indian ocean:—Principal groups of Chargos archipelago. 2031, Ceylon, east coast: Caratievoe to Pedropoint. 888, South America, east coast:—Rio Mossoro to San Roque. 376, Newfoundland:—Broyle harbour to Renewse harbour. 2530, North America, west coast:—Diego bay to Cape Mendocino. 2880, North America, east coast:—New Bedford harbour. 1100, Pacific, Arzobispo isles:—Port Lloyd. 214, Pacific ocean:—Solomon islands. 1543, England, east coast:—Yarmouth and Lowestoft roads. 2169, Pacific ocean:—Midway island and Welles harbour. 2727, North America, east coast:—Cape Breton island. 2441, Japan:—Strait of Tsugar. 331, North America, east coast:—Wassaw, Ossabaw, St. Catherine's and Sapelo sounds. 928, China sea:—Sulu archipelago. 292, Newfoundland:—Harbours and anchorages. 944, Philippine islands:—Harbours on south side of Butuanga island, &c. 1392, China:—Pe-chili strait. 936a, b, Pacific ocean:—New Caledonia. (2 sheets.) 1033, Australia, south coast:—Champion bay to cape Naturaliste. 1034, Australia, south coast:—Cape Naturaliste to King George sound. 655, Africa, east coast:—Almeida bay. 667, Africa, east coast:—Port Melinda. 2456, North America, east coast:—Muskeget channel. 2020, Bay of Fundy:—Campobello island. 1872, North sea:—Calais to the river Schelde. 1440, Mediterranean:—Adriatic sea. 255, Jamaica, south coast:—Morant point to Port Royal. 2803, Australia, east coast:—Port Denison. 2489, North America, east coast:—Monomoy

harbour. 1772, Ireland, east coast:—Wexford harbour. 2486, North America, east coast:—Plymouth harbour. 727, Fiji islands:—Savu Savu bay. 2562, China:—Canton river. 524, Mediterranean:—Gibraltar new mole. 2806, North America, east coast:—Charleston harbour. 413, Cuba:—Port Mariel. 195, Mediterranean, Malta:—Valetta harbours. 2533, New Zealand:—Otago to Maitauri river. 1198, Turkey:—The Bosphorus. 2580, West Indies:—Cuba, eastern portion. 767, Pacific ocean:—Paumotu or Low Archipelago. 1639, Gulf of Mexico:—Louisiana and Texas coasts. 1258, China:—Approaches to Séoul. 2836*a, b*, Mediterranean:—Grecian archipelago (2 sheets). 2344, Gulf of Mexico:—Mobile bay. 2412, China sea:—The islands between Formosa and Japan. 2701, Adriatic sea:—Gulf of Cattaro to Corfu. 2212, China:—Hui-ling-san harbour to Hong Kong. 561, South America, west coast. Magellan strait to gulf of Pefias. (*J. D. Potter, agent.*)

Marine Board Offices, Port Adelaide.—Lighthouse Map of the province of South Australia, 1881. Scale 1 : 2,450,000 or 33·5 geographical miles to an inch. Marine Board Offices, Port Adelaide.

Marine Survey of India.—Charts Nos. 1257 and 1257*A*. Arabian Sea, including Ceylon, the Gulf of Persia, entrance to the Red Sea, and Zanzibar. Compiled by R. C. Carrington. Published at the Marine Survey Department, under the superintendence of Commander A. D. Taylor, Superintendent of Marine Surveys, Calcutta, 1881. 2 sheets, price 4*s.* each.

United States Hydrographic Office.—Charts Nos. 854*a* and *b*, and 855*a* and *b*. Indian Ocean. Compiled from the latest authorities. 4 sheets. Price 2*s.* 1*d.* each.—619, 620, and 621. The Coasts of Lower California and the Gulf of California. 3 sheets. Price 1*s.* 8*d.* each.—878. Istapa, or Isla Grande Harbor, West Coast of Mexico. Price 1*s.* 3*d.*—622. Coast of Mexico from Mazatlan to Tenacatita Bay. Price 1*s.* 8*d.*—875. Harbors on the West Coast of Mexico:—Angeles. Sacrificios. Price 1*s.* 3*d.*—874. Anchorages on the West Coast of Mexico:—Escondido. Morro Ayuca. Price 1*s.* 3*d.*—879. Harbors on the West Coast of Mexico:—Sihuatanajo. Petatlan. Teguepa or Papanoa. Price 1*s.* 3*d.*—363. Windward Islands:—Guadeloupe and adjacent islands. Price 1*s.* 3*d.*—526, 527, 528, and 529. North Pacific Ocean, compiled from the latest Authorities. 4 sheets. Price 2*s.* 6*d.* each. United States Hydrographic Office, 1881.

ATLASES.

Bevan, G. Phillips, F.S.S., F.G.S., &c.—The Statistical Atlas of England, Scotland, and Ireland, edited by G. Phillips Bevan, F.S.S., F.G.S., &c. To be completed in fifteen parts, each containing three coloured maps and letterpress. Part XI. Sanitary. Part XII. Geological and Mining. Part XIII. Hydrographical (Water Supply). W. & A. K. Johnston, Edinburgh and London, 1881. Price 7*s.* 6*d.* each part.

Stanford, E.—Stanford's London Atlas of Universal Geography, quarto edition, London, 1882. Price 1*l.* 10*s.* (*Stanford.*)

This atlas contains forty-four coloured plates, and an alphabetical index of the principal Mountains, Rivers, Capes, Bays, Islands, Towns and Villages, &c., given in the maps. It was partly designed by the late John Arrowsmith, and some of the maps were drawn and engraved by him; these have been corrected and supplemented to bring them up to the present state of our geographical knowledge. The object of the author of this atlas has been

to present in a handy form the usual maps on a sufficient scale for ordinary reference, and to repeat on larger scales those parts of the earth which are more nearly connected with English interests.

The arrangement of the maps in order of sequence agrees with the order in which the various countries are treated in the 'Physical, Historical, Political, and Descriptive Geography' by Keith Johnston.

Stieler, Adolf.—Hand-Atlas über alle Theile der Erde. Neu bearbeitet von Dr. August Petermann, Dr. Hermann Berghaus und Carl Vogel. Parts: 26, 27, 28, and 29. Price 2s. each. Justus Perthes, Gotha, 1881. (*Dulau.*)

The contents of these parts of the new edition of Stieler's Hand-Atlas are as follows:—

Part 26: No. 4. Gebiet der Sonne. Von Dr. Herm. Berghaus. No. 74. Süd-Ost-Australien. Von A. Petermann. 1:5,000,000. No. 90. Süd-Amerika in 6 Blättern. Bl. 1. Von A. Petermann. 1:7,500,000.

Part 27: No. 18. Das Deutsche Reich und seine Nachbarländer zur Übersicht der Eisenbahnen und Dampfschiffahrten. Von C. Vogel. 1:3,700,000. No. 26. Die Österreichisch-Ungarische Monarchie. Von C. Vogel. 1:3,700,000. Nebenkarte: Plan von Wien 1,150,000. No. 64. Indien und Inner-Asien. Nördliches Blatt. Von A. Petermann. 1:7,500,000.

Part 28: No. 6. Weltkarte zur Übersicht der Luft-Strömungen und Niederschläge. Von Dr. Hermann Berghaus. 1:111,000,000 (equatorial). Nebenkarten: Luftdruck und Wind im Nord-Sommer.—Luftdruck und Wind im Süd-Sommer. No. 62. Iran und Turan oder Persien, Afghanistan, Baluchistan, Turkestan. Von A. Petermann. 1:7,500,000. No. 89. Süd-Amerika. Übersichtskarte. Von A. Petermann. 1:25,000,000.

Part 29: No. 70. Nordost-Afrika und Arabien. Von A. Petermann. 1:12,500,000. Nebenkarte: Abessinien und Aegyptischer Sudan 1:7,500,000. No. 71. Süd-Afrika und Madagaskar. Von A. Petermann. 1:12,500,000. Nebenkarte: Table-Bay und False-Bay 1:500,000. No. 93. Süd-Amerika in 6 Blättern. Blatt 4. Von A. Petermann. 1:7,500,000.

Steinhauser, A.—Karten zur mathematischen Geographie. Blatt 2. Erscheinungen am Sternhimmel. Blatt 6. Uebersicht der vorzüglichsten Projectionen. Artaria and Co., Wien. Price 2s. (*Dulau.*)

EDUCATIONAL.

Kiepert, Richard.—Schul-Wand-Atlas der Länder Europa's. Scale 1:1,000,000 or 13·6 geographical miles to an inch. D. Reimer, Berlin. Part 1. Stumme Physikalische Wandkarte von Frankreich. 4 sheets. Part 2. Politische Wandkarte von Frankreich. 4 sheets. Price 5s. each part. (*Dulau.*)

Saile, F. X.—Wandkarte des Kreises Olpe, zunächst für die Schule. Scale 1:40,000 or 1·8 inches to a geographical mile. 4 sheets. Gebweiler, Boltze. Price 9s. (*Dulau.*)



PLAN OF
THE GREAT GEYSIR

and neighbourhood
from a survey by

M^r Cuthbert E. Peek and M^r John Coles

SCALE OF ENGLISH FEET
100 0 100 200 300 400

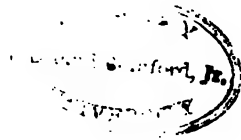
Natural Scale 1:3840, or 1 inch = 250 feet

Edw^d Waller, del.

and San Francisco
1877

39°

EAST AFRICA.





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

A Three Months' Journey in the Makua and Lomwe Countries.

By H. E. O'NEILL, H.B.M. Consul, Mozambique.

(Read at the Evening Meeting, March 13th, 1882.)

Map, p. 256.

On the 19th of August, 1881, I left the island of Mozambique in the small schooner attached to the Consulate, with twenty-seven natives engaged to act as carriers, for a journey westward into the Makua and Lomwe countries. My equipment consisted of two small tents and about 50*l.* worth of cloth, powder, and beads, with a few flint-lock guns intended as presents to chiefs. On the 21st I arrived at Kivolani, and on the 23rd landed my party on the inner shore of Mokambo Bay, encamping at Mdigwidi, a village about two miles from the coast. Here I was delayed four days, subject to the usual vexations incidental to a departure for the interior, when the country to be passed through is almost unknown. Within a week of leaving Mozambique I lost six men by desertion, their hearts failing them on the threshold of the journey. The places of these had to be filled, additional carriers engaged, packs rearranged, guides obtained, and many minor details settled.

At length I got away, on the afternoon of the 26th, and after three hours' march over a level and fairly populated country, encamped at Emwawalo, the hamlet of a petty chief of that name. A short march the next day brought me to Mlobwe, the village of the first chief of any importance on my route. I remained here two days waiting for my guide, Hambari, an Ajawa trader in the Makua country, who had refused to leave the coast with me on the 26th, that being the last day but one of the Ramazan month. On the 29th he joined us, and on the same day I proceeded to Nyiga, the centre of a district ruled over by a drunken young savage of that name, the worst specimen of a Makua chief I have met. He was drunk and bumptious when I met him, shouting in my ears the information that he was "Nyiga-mnu," or "the great Nyiga," who ruled over the whole country from this point to the

shore ; and after asking if the English were not a people who refused to allow slavery, indulged in such silly antics as striking his spear into the nearest tree, in illustration of the manner in which he treated all who displeased him. The next morning I found his majesty very shaky and nervous, a state that was greatly aggravated by the sight of my pocket compass, the quivering needle of which he refused, after a momentary glance, to look at again. I took advantage of his condition to insist on proceeding on my way by the village of Bwebwe, which he had expressly forbidden me to do the day before. Taking a sheet of paper from my writing-case, I read aloud a list of stages from the coast into the Makua country, simply saying "njia imekwisha ku andikwa siwezi kuiwacha"—"the road is written, I cannot alter it." The fact that a road into the heart of Makuani was known and written was too much for him, and shortly after he beat a quick retreat, glaring at me as if at something uncanny, and promising a guide to Bwebwe, apparently only anxious that I should be gone.

On the 31st the village of Bwebwe was reached, after crossing the rivers Rendeni and Natovi, flowing north-east, both tributaries of the Mromonio, which empties itself into Mokambo Bay. The chief of Bwebwe, a man of fine stature, but quite blind, received me in his *baraza*, surrounded by stakes topped with human skulls, relics of the intertribal wars not unfrequent in this country.

From this point the first hills, called Namtitari, are seen, their peaks apparently of granite bearing north-west, with abrupt precipitous sides and bold shapes, but of no great altitude. This range is reached about the forty-eighth mile, by a very gentle ascent, and from this to the hundred and forty-second mile, the country assumes a character different from the level, well-wooded, populous, and fairly cultivated country of the coast. Granite slabs and boulders begin to appear about the path ; the hills which successively come into view increase in size and boldness of form ; bamboo cane takes the place of the vegetation of the lower country, and some brown rocky beds show the course of mountain torrents in the rainy season.

It would be tedious to enumerate each hill passed and river forded, as we trudged along for six days, preserving a steady W.N.W. direction, over the next 100 miles of our route between Bwebwe and the plain of Shalawe. The names were obtained and bearings taken of all the most conspicuous of the hills, and their approximate positions may be seen in the map that accompanies this paper.

Three of these hills, called Nipagani, Tugwi, and Nabalaka, especially attract the notice of the wayfarer, the path winding closely round the foot of their smooth inaccessible sides, which rise sheer to a height of 400 and 500 feet ; but the most important are the hills of Ndimwe, Kugue, and Erewa, to the north, and the peaks of Mukitu and Misudi to the south, which are of more than double that altitude.

Of the rivers crossed, the Njeka, Nipagani, and Kutugula flow south, and are tributaries of the Mji Mkwali; but all three are small, and in this, the dry season, little more than mere rivulets. Very different was the Ngambo, which twice cut up our path with its broad rocky bed, shallow and easily fordable now, but evidently in the rains a rushing mountain torrent, unnavigable and, I am told, quite impassable at the points crossed by us. Its banks, beautifully clothed with vegetation of the freshest green, clearly marked its course through a country parched and tinted yellow by the burning sun. I had heard from native traders much of this river, which discharges itself at Ufugu and Jasa, in the sandy promontory of Sancoul, and therefore was not surprised to find it so clearly marked even more than 100 miles from the coast.

At the one hundred and first mile a descent is made into a pretty little basin, between two and three miles in diameter, completely surrounded by hills, called Kutugula, fertile and inhabited, out of which flows to the southward the river of the same name.

The severe sickness from fever of one of my headmen, who had to be carried the last 25 miles of this stage, compelled me to rest on the 6th and 7th, and it was not until the morning of the 9th of September, at the hundred and forty-second mile from the coast, that we gained our first view of Shalawe, and the magnificent hills visible from it. Chiga and Mubwi are the most marked of these, rising to a height of between 2000 and 3000 feet above the plain, which rolls away to the north-west, west, and south, to a distance varying from 20 to 40 miles, as the view is left open or cut off by the hills that rise up from and seem to surround it. A slight descent brought us within an hour to the town of Shalawe, consisting of a number of scattered groups of houses, and ruled over by a chief named Gavala.

We had now reached the outskirts of the country of the Lomwe or Upper Makua. For the past five days we had been crossing a belt of broken or sparsely populated country, which forms the geographical division, at this parallel, between these two sections of the Makua race, and although trade and contact with the coast natives have reduced the natural distinctions between the people of the plain of Shalawe and the Lower Makua, placing them, as it were, midway between the latter and the Lomwe, I do not think any other than this can be laid down as the line of demarcation between them.

At this point in my journey I had to contend with many obstacles, only with difficulty overcome. My guide, a thorough Ajawa, far superior in intelligence to the Makua, and with an extraordinary influence over their chiefs, possessed here a house and women, and was by no means to be forced forward on his way. My small stock of cloth, powder, and beads began to dwindle dangerously from the constant necessity of buying food for the party. In order to eke out what remained I gave the order for one of my tents to be cut up, so that the

canvas might be bartered for food. Five of my coast men, engaged for the whole journey, took advantage of the departure of a small caravan for the coast, to desert me here. And although, after eight days' delay, I insisted upon going forward, and in fact did push on one stage further to Nabitera, I was compelled, after five days' stay there, to return to Shalawe, to await the convalescence of my guide who now declared himself sick and unable to proceed.

I was delayed by these accidents three weeks at this point between the first and second greater stages of my journey, and I will profit by the break to make some remarks on the habits and customs of the Makua people, from information collected, not only during this period, but also upon five previous journeys near the coast, and a residence of nearly three years at Mozambique.

It will be seen from the map that I divide the Makua race, who occupy a tract of country, stated roughly, larger than England, into four great divisions, the Low Makua, the Lomwe or Upper Makua, the Maua, and the Medo.

Of the two latter nothing, as yet, is clearly known, but I do not think that in any very essential points they will be found to differ from the two first, when we learn more of them. A difference, chiefly dialectic, in the language spoken by them, such as the annexed table shows to exist between the Makua and the Lomwe, and some distinctive features in their tribal marks and characteristics, will, I have little doubt, be found to be the main points of difference. The succeeding remarks, however, only apply to the Low Makua and Lomwe through whose country I have passed.

The tattoo or distinctive tribal marks of the Makua vary considerably amongst the different divisions of the race. They are deepest and most marked in the Low Makua, whose forehead is generally broadly gashed with a crescent, having its points on each temple, and again at the corners of the mouth are deep upright gashes of nearly an inch in length. Groups of spots and short thick lines upon the arms, stomach, and back, complete this strange adornment. This crescent on the brow is wholly confined to the men, and the marks upon the women are lighter in character and less numerous. Amongst both sexes, however, the tattoo becomes scarcer and less marked as you penetrate westward, and many of the Lomwe are to be seen with faces almost free from it.

The young Makua dandy collects and ties his hair tightly to the thickness of a quarter of an inch in diameter, with fine string, made from the roots of a tree called *mlamba*, so stiffly that it stands out from the head like so many short rods, pivoting only at the base. The ends of these are then passed through a bunch of large red beads. Others shave broad furrows upon their heads which intersect each other at right angles and leave the hair in oblong patches upon the scalp,

The front teeth of the Makua are, as a rule, filed to a point, and the women bore the upper lip to insert a disc or cylinder, made from a large sea shell, which sometimes reaches the nose.

With regard to dress it is difficult to say much where so little is worn; and the fashion of wearing it so uniform and simple. Where cloth is obtainable, the men wear a strip brought up to a string round the loins, with flaps 10 or 12 inches in length, before and behind, and a single piece wound once round the body below the waist and reaching to the knees, constitutes the most complete dress of a woman. But as you get westward the skins of animals take the place of cloth, and both sexes arrange them in flaps such as I have described. Sometimes these are cut into curious shapes; the arm of a Maltese cross, the extremity downwards, being common for the hinder one.

Brass rings upon the arms and legs are the distinctive ornaments of a Makua chief and his wives, and are worn by no one else. But amongst the common people women may often be seen with a circlet of beads upon the brow, and the younger ones with a heavy roll, generally pink and black, around the neck. One point of resemblance I notice between the Lomwe lady and her civilised sister. Both prefer the fashions and manufactures of other countries to the customs and products of their own. Thus when the choice of a Makua damsel lies between the skin of a gazelle and a bunch of beads, she invariably throws aside the former and displays herself adorned purely and simply with the latter.

In saluting his chief or any person to whom he wishes to show respect, the Makua stoops forward and stretching his arms to their full extent at an acute angle with the body, gives two, three, or more distinct claps with the hands, the number of claps signifying the proportion of respect to be shown. At Nyiga I was witness of a curious spectacle; the morning salutation of a Makua chief by his wives. About forty women, I counted over thirty, were on their knees in front of the verandah in which was seated the chief. Erect in this posture they were slowly and softly clapping their hands, taking time from one of the party. Whilst this went on, and it lasted several minutes, we were kept waiting on the outskirts of the enclosure, and not until the women had risen and left were we motioned to approach. The effect was not at all displeasing even to a stranger. Though the attitude was a little servile, there was nothing like fear evident in the faces of the performers, and as a salutation it was respectful, even natural with such surroundings, and not unmusical.

The Makua chief lives only amongst his women; and the enclosure which contains his and their huts none but a privileged few dare approach. His *baraza* for official interviews is always outside this. They cook his food, make his "pombe" (a native liquor brewed from Indian corn), which he drinks from a calabash held by the hands of one of his favourites, and are his constant attendants, administering to all

his wants and pleasures. When making a call upon a stranger, he is often attended by several, and I have even seen the office of sword-bearer discharged by one of them.

Many keep a great number of women; Nyiga and Bwebwe had about 100 each, Gavala and Namùrola over 200; and the enclosures, crowded with their huts, would readily have held that number. If one of my guides wished to give me a great notion of the importance of a chief, he generally said, "He does not know in what hut he sleeps." Perhaps it is with a view of keeping some record of his whereabouts that the huts of his women are divided into blocks, in each of which live some thirty or forty, four or five in each hut. At periodical intervals he departs from one to the other, and this change is celebrated by a great *ngoma*, or beating of drums, amongst those of the batch to which he is the incomer. The separation between these divisions is not apparent to the eye of a stranger, but I have everywhere been assured that it exists. Nor does his departure from one to the other imply an actual change of residence, as his own hut is always distinct from those of his wives, but only denotes a change in the direction of his marital visits.

The Makua is passionately fond of public speaking, and around the camp fire, when the coast native would sing and dance, the Makua rises to address his companions in a speech. The chief peculiarity of this habit lies in his invariably being accompanied by a second or assistant, who rises with him, and after first calling attention, in high falsetto tone, with a "high-ho-ah-heh," continues this, with variations, through every pause in the speaker's address. The object seems to be partly to avoid any gaps or "awkward pauses" in the speech, and it appears partly to be prompted by a musical instinct. If the orator, in the excitement of debate, unduly raises his voice, his second at once modulates the accompaniment, as if in deprecation of the harshness of the orator's tones, or perhaps to strengthen by contrast the force of his delivery. If, as is not uncommon amongst European speakers, he thunders his peroration, the final accompaniment is lengthened in declining cadence, until it dies away in the faintest possible tones. The speaker and his second follow each other in quick succession, and the sentences are invariably short. The varied and singular tones of this accompaniment, resounding through the forest in the stillness of the night, at times more like the call of a strange, unknown bird, than that of a human being, have a strikingly weird effect.

The dances common amongst the people are neither graceful nor delicate in character, and it is impossible not to see that some of the motions are intentionally suggestive. I was once at Nabitera serenaded by some wives of the chief, who were sent by him to dance before my tent in my especial honour. The dancers, whose arms and legs were adorned with brass rings, wore the usual strip of calico tied round the stomach, reaching to the knees, and carried in one hand a zebra's tail.

The body was then inclined slightly forward, and the tail waved slowly from side to side. In this attitude the muscles of the upper half of the trunk were kept as lax as possible, evidently to display with greater effect a quick side to side motion that was given to the hips and buttocks, whilst the legs were kept a little apart, and the dancers waddled alternately backwards and forwards a few paces. One deep-toned drum was beaten with the hand by the oldest hag of the party, who with shrill voice and quickening beat incited the dancers to their utmost exertions, until they pretended to fall exhausted. Two smaller drums beaten with sticks, and a shrill, discordant chorus, in which all the women joined, added to the general din and excitement. This dance is not peculiar to the Makua. I have myself seen one very similar to it, at a wedding in the Wazaramu country abreast of Zanzibar.

It is difficult to discover with any exactness the ideas of a primitive people upon such subjects as the existence of a Supreme Being, life, death, and the future, for they are necessarily most dim and undefined. Some sort of shadowy belief the Makua seems to have in the presence of an all-powerful deity, and he has a word in his language, "Mlugu," to express that Being. Strange to say, that whilst acknowledging the existence of a God, he does not connect Him with any of the evils or blessings of this life, and he renders neither Him, nor any representative image, adoration or worship. In the existence of harmful spirits who roam amongst the living he has a fixed belief, and to their presence he seems to attribute all evils, such as sickness, drought, and even death itself. His helper is the "medicine man," or witch doctor; his remedies, some preparations of roots and bark, also food and clothing to be hung on the branches of trees, in the hope of appeasing the spirit whose anger has been roused. But these spirits are in his belief only evil and unnatural ones, and he has no conception of a spiritual existence in the human being, separate from the corporeal and undying. His idea of the future is rather that of the French Republican of the reign of Robespierre, that "death is an eternal sleep"; and his dead are, with the exception of the chiefs, buried in a reclining posture. I must confess that the practice of burying their chiefs seated seems rather to conflict with this statement of their idea of death; also the fact that in some cases, such as the decease of a powerful chief, the living are sometimes buried with the dead, as if to accompany them in some future state. I was told whilst at Shalawe that the predecessor of Gavala had five or six of his favourite women buried with him; that the chief was placed in his grave in the usual sitting posture; that the women, dressed in their finest clothes and heavily adorned with anklets and bracelets, were placed in the grave standing beside him, and that the earth was then thrown in, and they were buried alive.

The government of the country consists of a number of petty despotisms, and the word of each chief is law throughout the tract over

which he rules. The more powerful are assisted by a few headmen, who settle minor disputes, the parties having always right of appeal to the chief. The position of some of these chiefs is no sinecure, and I found the most powerful constantly engaged in settling complaints and punishing crime. These primitive law courts are all of similar construction. That at Shalawe was a large umbrella-shaped edifice, of bamboo thatched with grass, the interior adorned with leopard skins hung from the roof. On one side was a dais, with a low seat for the chief, and, conveniently placed outside, a forked stake was driven into the ground to which delinquents were bound.

But amongst the majority of Makua and Lomwe chiefs I saw no evidence of savagery or wilful cruelty, such as is not uncommon amongst African chiefs who rule over large tracts of country. Their great number and relative independence in Makuani exercises a wholesome restraint upon those whose dispositions, like Nyiga and Mudia, incline them to be arbitrary and unjust. If by despotic dealing one makes himself objectionable to his people, their remedy is simple: they desert him for one milder and more just.

Though separately and distinctly independent, there is a commonalty of interests along the lines of the trade routes, binding most of these petty chiefdoms, which I found to be most useful to me in penetrating the country. The coast traders in Makuani being comparatively few in number, parties from the interior are constantly passing to and from the coast, carrying indiarubber, ivory, rice, sometimes slaves, with which to trade on their own account. To secure for those parties safe-conduct and good treatment, it is clearly necessary that friendly relations be preserved between all the chiefs along the line of route. Thus, starting from the shore with guides obtained from two coast chiefs, who were instructed to say that I was "Mgeni zas," or "their stranger," I found myself armed with an escort stronger than a hundred Sniders, and this friendly escort was strengthened at Shalawe by the son of Gavala. Where legitimate trade has not penetrated, as, for instance, amongst the Lomwe west of the Malema, and even amongst such hill tribes as Nbadua, this peaceful commercial influence is absent, and the consequence is shown in the relations that exist between many of these hill chiefs and their neighbours.

To settle the guilt or innocence of an accused person, or, indeed, any doubtful point, the practice of giving *muavi* or the poisonous concoction of the bark of a tree, common to the natives of the Nyassa and Zambesi valley, is carried out. Where no person is concerned it is here given to a dog. At Shalawe I had to submit the settlement of a question, as to whether I should proceed by a certain road, to this form of decision. The dog was shut up overnight in the house of a "doctor," whose special duty it was to mix the poison, and ensure its being taken upon an empty stomach in the morning. Before the dose was prepared,

I assisted at a solemn consultation, which was attended by two *muavi* dispensers, two of my headmen, and presided over by the chief. The desired road was then named by the chief, and the head "doctor" enjoined to discover by means of his craft, whether it was clean and passable. As I was in the position of an interested party, I was not allowed to see the operation, but my two headmen attended to report proceedings. If the poison was vomited, the road was clear, or in the case of an accused the person was innocent. If the dog or person died, the road was blocked, or the accused guilty. In this particular case the dog died, and a slight change had therefore to be made in the route. Before performing the operation, the "doctor," a fat and flourishing looking personage, did not forget to hold out his hand for the fee, which consisted of a yard and a half of calico, "for the purchase," as he delicately put it, "of the dog."

Circumcision is often, but not invariably practised, and it appears to be a matter of choice.

At length, after nine days' absence, our messengers returned from Mátuga, Mudia, Mazua, and Namùrola, with favourable answers to my request to pass, and without further delay we left Shalawe on the 3rd of October for the first of these chiefs. On the same evening we camped upon the left bank of the Uchinai, a small tributary of the Mkubure.

A long day's march on the 4th brought us at sunset to Mtina, a chief subject to Mátuga, but wealthier and more powerful, from the accident of his living near the trade route, and claiming the lion's share of the tribute exacted from passing traders. One of the chief employments of the inhabitants of this place and of Mátuga, is the smelting and working of iron, the ore of which is procured from the neighbouring hills of Chiga. I had several opportunities of inspecting one of these Makua smithies. The manner of working is very similar to that described by Livingstone as common to the Ajawa or Yao-tribe. The charcoal furnace is blown to a white heat by four separate blowers worked by hand, consisting of skins of a small deer, into each of which is bound a retort made of clay, the mouth leading into the fire. The anvil is a slab of granite; the hammer a heavy cube of stone, slung with fibre-cord let into grooves at its sides. I saw hoes and knives, and axes of tomahawk shape, deftly worked by these people, and what will seem strange to the English manufacturer, I met with hoes being carried for sale to the shore from this district, a distance of over 150 miles. Labour is so cheap that they undersold those imported.*

Leaving Mtina I turned aside to the southward to visit the chief Mátuga, who lives at the foot of Chiga hill; but without delaying

* Mr. O'Neill has sent some specimens of Makua workmanship in iron and other articles, which are now on view in the Map Room of the Society.—Ed.

longer than an interchange of presents rendered necessary, pushed on in the afternoon and encamped at night on the left bank of the Mkubure river.

From this point we could see that Chiga was not a separate or detached hill, but the extremity of a range of considerable altitude, that stretched away as far as the eye could reach, in a south-westerly direction, the ridge of which forms the watershed of the Mluli and Mkubure river systems. The latter, which discharges itself at Mwendazi in Mwemba Bay, has its source in the numerous streams that drain the western slope of this range, and even at this point carries a considerable volume of water during the greater part of the year.

In the rivers that drain its eastern slope the Mluli has its origin, and this river is said to form, with the Liconya, that which is marked in our charts as the "Angoche or Angoxa" river. In support of this I may say here, that when at Angoche a short time since, I visited a district upon the banks of a river, flowing into the Angoche arm of the sea, called Mluli by the natives of that part of the coast. This I think is more than a coincidence, and may be accepted as fair proof of the truth of the native report, connecting Angoche river with the Mluli of Chiga.

Two days' march further westward, in which we slightly descended into another of those plains or terraces, which lie between these successive ranges, brought us to the villages of Mudia and Mazua, within half-an-hour's walk of each other. The former, a very unfavourable specimen of a Makua chief, had within the past year left Nachere in the plain of Shalawe, on account of the growing power of Gavala, whom he had reason to fear. A turbulent bully, he was again earning for himself here the worst reputation amongst traders and his brother chiefs. Only a few months back a native trader was robbed by him of all his goods, some of his men wounded, and he himself only rescued by the intervention of a neighbouring chief. For nearly two days I was kept wrangling with this savage, reducing the exorbitant demands made by him. Simply the fact that a more powerful chief than he, Namùrola, had expressed a wish to see me, prevented, I think, my being turned back at this point; and only the superstitious dread that attaches itself to the presence of the first white man, hindered the chief from violently enforcing his demands.

It is curious what trifles assist the first white traveller in such a country. I do not exaggerate when I say that my eye-glass added greatly to this feeling of fear. Whilst in the country I used it with discretion, for when I put it in my eye men averted their faces, and women, horror-stricken, turned and fled. "He does it to draw people from a distance to his feet," was the remark of a terrified Makua, as translated to me.

The chief Mudia was with difficulty persuaded to enter my tent,

and when there he was so disturbed at the sight of a book that lay open before him, that he refused to keep his seat unless it was removed. When this cloak of dread shall have dropped off, it may be more difficult for the traveller in the Lomwe country, unless well armed and equipped, for man to man they are a bold race and inclined to take by force what they cannot obtain by suasion.

A messenger from Namùrola inquiring into the cause of my delay, hastened my release, and on the 10th we resumed our march, arriving the same evening at the village of this chief, pleasantly situated in the valley of the river Kaule. We are now at, or very close to, the point furthest west reached during this journey. My stay here was prolonged to eight days, but I do not think the time was altogether lost, for I was enabled to gain by close inquiry from those who had a personal knowledge of the districts, a good deal of information respecting the rivers to the southward of this, and to lay down, I trust pretty accurately, the road to be taken to the Nyassa.

The river Mulugu, which takes its source in the hills of the same name, about thirty miles to the southward of this, joins with the Mlela to form the Maravoni or Quizungu rivers. I found opinions divided between these two, and it is not surprising that there should be some uncertainty, so far from the mouths of two rivers which empty themselves very close to each other. There was no hesitation, however, with respect to the Likungu, of which the Lomakura is said to be the main branch, uniting with the Likugu, as it is here called, to form the Likungu of the coast.

The road to the Nyassa from this point is said to occupy only six or seven days, and very possibly it may be performed in that time by the natives. I prefer, however, to call it nine or ten by the following route, which appears to be the most direct, and provides convenient stages for the purchase of food, &c.

From Namùrola to Mohemela is between two and three days' journey; two more days brings you to Mwedederi, the last of the Lomwe; thence to Mnaremba, a chief in the Ajawa country, occupies two days, and the lake is about three days' distance west of that. There is, however, no regularly frequented, caravan traversed road from this district to the Nyassa. Parties of Ajawa are frequently to be met with in this country, and parties of Makua also cross over into the Ajawa country to procure the salt that is found there. But coast traders to the Nyassa do not now take this route, preferring that which passes through Mwalia in the Medo country. This only confirms the information given us by our Nyassa missionaries, respecting the caravan road to the Mozambique coast. I am told that formerly the road I have sketched out was constantly traversed by traders. Its disuse now appears to be owing to the ravages of the Maviti, who reside in its neighbourhood, and who four years ago descended eastward carrying

desolation as far even as Nachere, in the plain of Shalawe, until a combination of Makua chiefs drove them back to their hill fastnesses. At many points on the march west of Shalawe, chiefly from Namùrola to Nbadua, I was shown spots which had been occupied by them during this raid into Makuani.

Whilst at Namùrola I also ascended a hill 500 or 600 feet high, and had a fair view of the mountain range which rises up west of the valley of the Malema, culminating in the Inagu Hills and Namuli Peak, and forming, if native accounts be correct, the watershed of the rivers of the Mozambique coast, and those that on its western side help to feed the Lake Kilwa and its outlet, the Lujende, or Liendi.* I wish, however, distinctly to say, that although the position of Namuli Peak was pointed out to me, I could not clearly distinguish it. A magnificent range of hills was visible, running apparently north-east and south-west, but the summits of its peaks and many of the hills themselves, were totally lost in the mass of cloud and mist, which the southerly winds had been drifting up during the past week, and which were, even now, descending as the first of the rains. I have concluded that this peak is snow-clad from the repeated accounts I have received, not only from coast men who have traded in the Malema valley, but also from chiefs and others who live comparatively near the spot. The usual description of it is, "Its top is always white," and "Mnwisho zake huwezi kuma," or, "Its summit is invisible."

It was with a feeling of bitter disappointment that I saw myself compelled to turn, when almost at its very foot. But a quarrel of some months' standing between Namùrola and Mohemela, in which people had been killed and ivory seized on both sides, had broken the direct westerly road, and my messengers to Mriba, a chief living in a south-westerly direction, returned with very unsatisfactory answers. My supplies were also running miserably short. Under these circumstances, I had no alternative but to consider the best way to return to the coast.

The road by which I came I determined to avoid, and hearing that at times parties left Namùrola and the Mohemela district for Kissanga and the Lurio, via Mwalia, I resolved to push northwards and try and reach the coast by one of these routes. This resolution cost me the loss of the Ajawa who had been my guide from the coast, a loss for which I cannot say I felt the smallest regret, as he had been a constant source of trouble and vexation to me.

Seven guides and carriers were very kindly provided me by Namùrola,

* The information that I have before given of the origin of the Lujende in the Lake Kilwa, is, I notice, indirectly borne out by that obtained by the Rev. Chauncy Maples, at its junction with the Rovuma, who states that natives report it "to flow out of a lake which would be reached by following the stream for twenty days beyond Mtarika's."

[According to a recent communication from the Rev. W. P. Johnson, of the Universities' Mission, who traced the Lujende upwards into a lake, Lake Kilwa is probably identical with the Lake Shirwa of Livingstone and Kirk. *Vide* 'Proceedings' R. G. S., 1882, p. 47.—Ed.]

and with them I started on the 18th for Nbadua, a hill chief, four days' journey to the northward.

A short march in a north-north-westerly direction brought us to Nagulue, which was actually the point reached furthest westward. The next day we rounded the Matari Hills, on the west of which the Nalawa, an affluent of the Bwibwi, takes its source, and fairly entered the hilly district marked on the accompanying map. We were, on this stage, skirting an enemy's country, and our road passed a point where a couple of months back a party of Namirola's men had been waylaid by those of Mohemela, several killed, and the remainder captured and sold into slavery. Our guides therefore kept a sharp look-out, and at night when camping on the Mgwasi, a stockade was skilfully thrown across a neck of ground jutting into the river, consisting of bamboo cane backed up by branch and bush, which gave us perfect protection against man or beast. The latter, I think, was the only real danger, as these hills abound in large game, and at night we heard the roaring of the lion and the cry of the leopard not far from our encampment.

The third day's journey on this stage led through a very fine gorge in the hills, with Ribawe as its eastern extremity. Two cone-shaped hills, shooting up independently at its entrance, as if as its portals, form a peculiar and distinctive feature of this pass. Passing round the southernmost of these, we turned our faces to the northward, and entered the valley of the Bwibwi, camping on the right bank of the river, a few hours' march from Nbadua. The next morning we arrived in a couple of hours at the village of the chief.

Here I remained four days, and I think I may say it was the only place I felt sorry to leave. To an eye surfeited with the flats of the coast, the Bwibwi valley at Nbadua seemed one of the pleasant spots of the earth in which to dwell. On one side the river ran, clear and sparkling as a Westmoreland trout stream, the Mtobe Hills rising abruptly at this point to form an almost overhanging bank; whilst from the opposite bank the valley, fresh and fertile, sloped up gently to the foot of the Erigoli Hills, which flanked it to the eastward. At one extremity and about 10 miles distant, the bold outlines and sharply cut faces of Ribawe shut out the view, and to the N.N.E. was a curious double-peaked hill called Elutu. It seemed a spot by nature intended for the peaceful and industrious amongst men.

But I found myself here in the hands of the Ishmaelites, whose hands were against all, and the hands of all against them. The chief Nbadua, a fine old veteran, deeply scarred on the scalp and different parts of the body, and pruned with an axe or sword out of three fingers of the left hand, still retained warm his fighting spirit. In the constant indulgence of this he had succeeded in blocking or rendering dangerous almost all the roads from his district. That to Kissanga and the Lurio district was unsafe through the enmity of Mbebe, the most powerful chief on

the road; an enmity which, as he laughingly confessed, had been roused in the first instance by his entrapping a party of Mbebe's men passing through his district. The Mwendazi or Mkubure road had been made impassable for his people by his capture of a son of the chief Rainya, who lives close to that river. And the only alternative to returning to Shalawe that he was able to offer me was, that his people could guide me until within sight of Mwima Hill, at the foot of which resided the chief Nabawa. Beyond this they durst not go, for with this chief also he had quarrelled. Without being actually at open warfare with any of these chiefs, he was upon what I must call man-trapping terms with all. Everything, my instructions first, considered, I thought it best to strike again south-eastward, and trust to Gavala to guide me to the coast by a road different from that by which I had come.

Accordingly, on the 25th of October, I again turned to the south-east, and journeyed the first day through the hills that bound Shalawe Plain to the northward, by a pass which winds close round the foot of Keha Hill. I have, therefore, called it the Keha Pass. In no part of the world have I felt the heat so intense as in passing through these hills, entirely bereft at this season of vegetation, in which the path leads over slabs of rock intensely heated by the rays of a perpendicular sun, the effect of which was greatly increased by the glare from the bare and abrupt faces of the hills on both sides. A very exhausting tramp of 20 miles opened out the plain of Shalawe, and at night I pitched my tent upon a small tributary of the Mkubure river, having crossed this day the water-parting of the Mkubure and Bwibwi rivers. We struck our old road at the foot of Pooso Hill, and took up our quarters again at Shalawe on the 28th, the last 10 miles of the stage being over ground we had already traversed.

That bit, however, I am glad to be able to say, was the only piece of ground we twice passed over. Without much difficulty I succeeded in obtaining guides for Karoa, a village about 60 miles E.N.E. of Shalawe, and almost equidistant from Mwemba and Mozambique Bays. On the second day of this stage, the river Mikati, which is said to connect with Calombo creek or Ampapa in Mozambique Bay, was crossed, and on the following day two of its affluents, called the Maririmwe and Kati. Next day we sighted some fine hills to the eastward, the last range between us and the coast. The most conspicuous of these were Eradi, Mwaja, and Nipoogo, all between 2000 and 3000 feet in height. In this stage we again crossed the belt I have spoken of as dividing the Low from the Upper Makua, and on the 3rd of November arrived at Karoa.

It is a noticeable fact that only amongst the Low Makua is to be seen the public exhibition of human skulls. This parade of killing is entirely absent amongst the Lomwe. From the day I left Bwebwe to the day I arrived at Karoa, I had not seen the house of a single chief adorned in this manner. Here again they met my eye, though only in small

numbers. In Makuani the usual rule that the highland races are the most savage seems to be reversed.

From Karoa I travelled for four days in an east-south-easterly direction to Mshilibo, crossing the dry bed of the Nikutushe, an affluent of the Mkubure. Upon this and the last stage we experienced great discomfort from the absence of water, and on several occasions travelled over 30 miles without meeting a drop.

Mshilibo was left on the 10th of November, and upon the following day the dry beds of the Tereni and Mariri, both tributaries of the Mkubure, were crossed. On the evening of the 11th, we camped upon the ridge which parts the Mkubure system from the rivers of the coast, and at midnight commenced a long and gradual descent to the shore. It was here that I witnessed a scene grand and picturesque in the extreme—a forest fire by night. The embers of the neglected fire of some encampment had been carried by the breeze amongst the surrounding grasses and thick undergrowth, now dry and withered by the burning sun. This once alight had rapidly spread, and crossing our path, was extending its ravages on our right. Looking southward, the stems and branches of every forest tree and thick twining creeper could be seen with perfect distinctness, lit up by a fire which ran in an unbroken line for more than a mile at their base. Many of these were clothed with fire, and taking motion from the leaping, quivering flame, seemed literally to dance against the lurid sky. Added to this, the ceaseless crackling of burning grasses and the crash of falling branch and heavier timber raised a din which was quite in conformity with the tragic grandeur of the picture.

The after effects of such a fire are almost as striking, but in a reverse way. A stillness as of complete death falls upon the scene, and the very breeze is unable to raise a murmur amongst the few charred and unyielding stems that alone are left standing. Animal life of every shape and form, unable to find sustenance from the barren ground, has fled. Of all the countless forms of vegetable life, from which a tropical forest derives its chief wealth and beauty, nothing remains but leafless branch, lifeless stem, and blackened ash-strewn ground. Through this our path of sand gleamed like a snow-white thread, and quickly and in silence we passed over it, glad to escape from a scene of apparent annihilation, upon which our presence seemed only to intrude.

At sunrise the Nihegehe, which flows into Fernando Veloso Bay, was crossed, and later on, on the same day, the Mukato, which, joining first the Sinyudi, discharges itself in Conducia Bay. During these last two days I made a hard push to try and catch the homeward mail, and walked 63 miles, not a bad "finish," I think, when the heat of a Mozambique November sun is considered.

At noon of Sunday the 13th we sighted the palms of Moosuril, a

joyful sight to my Mozambique boys, who had been absent from the sea for three months, and most of whom had never before lost sight of it for as many days. To my great pleasure I met at Moosuril His Excellency the Governor-General Visconde de Paço e d'Arcos, by whom I was most kindly received, given food and drink, in both of which I was greatly in need, and provided with a boat, without further trouble or delay, for conveyance to Mozambique.

I may be expected to say something of the prospects of trade in Makuani. There can be no doubt there is here a populous country comparatively untouched by the trader. To illustrate this I need only say that I met many parties of Makua proceeding to the coast from districts as far inland as Mohemela, a distance of over 250 miles, each man carrying a small bag, containing generally rice and sometimes a little indiarubber, with which to purchase a few yards of calico and perhaps a coloured cloth for his favourite wife, these articles being unobtainable in his country. Imagine a Highlander crossing the border and walking to London annually to purchase his winter's kilt, and you have an example of scarcity similar to this. Those Arabs and coast natives that do the work of traders usually deal directly with the chiefs, and the mass can only obtain their supplies in this manner. The profits made by these traders must be considerable, as I found calico realising at Namürola twenty times its value in indiarubber at the Mozambique quoted price.

On the other hand the products of the country, in its present unworked state, are few. Ivory, the most valuable of all, is by no means abundant, and year by year is getting rarer, and I am told that which brings the greatest profit is yet the slave, the restrictions placed upon this trade on the coast having considerably enhanced his value.

Iron there appears to be in plenty, but I am unable to express an opinion upon the prospects of success that a working of it would offer.

The collection of indiarubber might no doubt be greatly extended, but I know nothing else that, worked by the natives, would repay the cost of transport with the present means of communication.

A decided obstacle to successful trading in the country will be found to be the number, independence, and rapacity of the Makua chiefs. All traders have to pay a proportion of their stock to the chief, according to the amount of trade they do in his district.

The European trader will find that he himself is an excisable article, subject to heavy duty. My guides always carefully explained that I was no trader, that I sought no profit in their country, and asked only permission to pass; but, nevertheless, a heavy *in transitu* duty was always demanded. The tribute payable by a white for the privilege of trading in the country would be much heavier.

This paper would be incomplete if I were to say nothing of the journey of the intrepid Portuguese traveller Silva Porto to this coast in

1853 and 1854. I have not seen the record of his journey, which I believe is only preserved to us in the writings of some Jesuit fathers, but in a map by Dr. Petermann I see Silva Porto's track is marked between two lakes situated upon a tributary of the Lurio, one of which is placed in the heart of Makuani. I made careful and constant inquiries with respect to these lakes, and was everywhere assured that no such existed in the Makua country, or upon any tributary of the Lurio. The only lake that I can hear of is that of Kilwa, in the Ajawa country, which, as I have before said, is reported to be the source of the Liendi. It seems not improbable that there has been some confusion between these lakes. This probability is strengthened by the native statement that the Lake Kilwa is situated in a district called Muongoje, which name I find upon the shore of the easternmost lake in Petermann's map. Also I could, at no place I visited, discover any tradition of the passing of a white man through the interior of the Makua country, and I nearly reached its western limits.

I have added to the map which accompanies this paper the native names of places visited by me upon the coast between Ibo and Angoche; and have put in some few additions to the existing charts, all of which are marked in red. The great advantage of the native names over those given by Europeans, is I think recognised now by all surveyors, and the practice of collecting them has been followed out by the later English surveyors upon this coast.

I also append a short table of Makua and Lomwe words in order to show the difference between them; a difference that appears part dialectic, part radical, the latter I suspect owing to an admixture of Ajawa words that have naturally come into use amongst the adjacent Lomwe. The spelling and rule for pronunciation is that laid down by Bishop Steere, and generally adopted in later works on East African languages of this family, in which the vowels are pronounced as in Italian, the consonants as in English. The accent is as a rule on the penultimate, but where it is not so, the particular syllable is accented.

SHORT TABLE OF MAKUA AND LOMWE WORDS.

English.				Makua.				Lomwe.
Water	..	..	..	Masi	..	..	..	Mahi
Fire	..	..	..	Moro	..	..	..	Moro
Rain	..	..	..	Ebula	..	..	..	Ebula
Wind	..	..	..	Epeo	..	..	..	Etako
Road	..	..	..	Epiro	..	..	..	Empito, Medalla
River	..	..	..	Muro	..	..	..	Olusi
Place	..	..	..	Mahala	..	..	..	Niburu
Well	..	..	..	Wehime	..	..	..	Ehime
Head	..	..	..	Muru	..	..	..	Muru
Arm	..	..	..	Mono	..	..	..	Muono
Foot	..	..	..	Medo	..	..	..	Medo
Lion	..	..	..	Karamu	..	..	..	Mwato

English.			Makua.			Lomwe.
Leopard .. ..	..	..	Havara .. ..	..	..	Keregege
Goat .. .. .	..	..	Eburi .. .. .	..	..	Eburi
Fowl .. .. .	..	..	Ekh .. .. .	..	..	Ekù
Lake or swamp ..	..	..	Nrata .. .. .	..	..	Antia
Hill .. .. .	..	..	Mwago .. .. .	..	..	Namwago
House .. .. .	..	..	Emumba .. ..	..	..	Emba
"Baraza," or place of public audience			Ebaru .. .. .	..	..	Mtego
Stone .. .. .	..	..	Malugu .. .. .	..	..	Matagaliwe
Earth, clay .. .	..	..	Mitaga .. .. .	..	..	Mihava (black), Ekotokwa (red)
Food .. .. .	..	..	Yolya .. .. .	..	..	Mrogwe
Cold .. .. .	..	..	Uriria .. .. .	..	..	Nakutu
Cooking pot .. .	..	..	Nkariku .. ..	..	..	Eduo
Gun .. .. .	..	..	Kaputi .. .. .	..	..	Mtapiko, Mbila
Spear .. .. .	..	..	Nivaka .. .. .	..	..	Mkuluba
Knife .. .. .	..	..	Mwalo .. .. .	..	..	Benyago
A male .. .. .	..	..	Mlobwana .. .	..	..	Mwaluku (before the age of puberty), Mtogweni (an adult male), Oluvala (an old man)
A female .. ..	..	..	Mtiana .. .. .	..	..	Mtiana
Many .. .. .	..	..	Njeni .. .. .	..	..	Ncheni
Few .. .. .	..	..	Vakani .. .. .	..	..	Mwananchu
Good, pretty .. .	..	..	Bera .. .. .	..	..	Ohapa
Bad .. .. .	..	..	Othakala .. .	..	..	Owarara
To buy .. .. .	..	..	Utuma .. .. .	..	..	Utuma
To sell .. .. .	..	..	Utumiha .. .	..	..	Utumiha
To eat .. .. .	..	..	Olya .. .. .	..	..	Olya
I want .. .. .	..	..	Ginátuma .. .	..	..	Ginàmkwela
I don't want .. .	..	..	Hagintuna .. .	..	..	Ginòkwela
He does not want	..	..	Gantuna .. ..	..	..	Kanòkwela
I see .. .. .	..	..	Ginàona .. ..	..	..	Gibali
I am coming .. .	..	..	Ginàroa .. ..	..	..	Ginakoka
He has gone .. .	..	..	Oroa .. .. .	..	..	Okoka

Previous to the reading of the foregoing paper—

The PRESIDENT informed the Meeting that it contained an account of a journey of three months' duration inland from Mozambique by Her Majesty's Consul at the latter place. They had not the advantage of the presence of Mr. O'Neill himself, as he was still at his post, and the paper would therefore be read by the Secretary, Mr. Douglas Freshfield. Mr. O'Neill had been an officer of the Navy, serving on board H.M.S. *London* off Zanzibar. Whilst there he profited by his opportunities to learn the *lingua-franca* of the East Coast, the common medium of intercourse in the country opposite Zanzibar and further south to Mozambique. Subsequently he left the Navy, and on the death of the late Consul of Mozambique, the well-known traveller Captain Elton, he was appointed to the vacant post. After his appointment he executed several journeys along the coast until he became well acquainted with it; and then he determined on the longer expedition which would be described in the paper. A remarkable fact in connection with the subject was that the vast territory of Mozambique for the last 200 years had been in the possession of the Portuguese, and yet so far as could be ascertained no Portuguese of unmixed blood had ever been more than 20 miles inland. Mr. O'Neill, however, had travelled 200 miles inland in the direction of Lake Nyassa. The whole of his journey in that

direction covered 500 miles. The country was practically unknown to Europeans, and this was the first account that had been given of it. Another interesting circumstance was that Mr. O'Neill performed his journey at the same time that Mr. Thomson was proceeding with his expedition up the Rovuma, and the Rev. Chauncy Maples was also travelling at that time over a district a little south of the Rovuma.

After the paper—

Mr. JOSEPH THOMSON said that having just returned from the region adjoining that which Mr. O'Neill had travelled through, he had listened with particular pleasure to his interesting narrative. He made Mr. O'Neill's acquaintance four years ago, when that gentleman was a lieutenant on board the *London*; and there could be but little doubt that the enthusiasm which he had since developed for African exploration was first kindled under the inspiration of Sir John Kirk, who was so successful in inoculating others with his own enthusiasm. It was a very interesting and suggestive fact that three Englishmen should have been travelling in the same country at the same time without any knowledge of each other's movements, and yet not infringing on each other's districts. Thus, Mr. O'Neill kept to the south of the Upper Makua country, the Rev. Chauncy Maples to the middle part, and he (Mr. Thomson) along the northern boundary up the river Rovuma and the Lujende. From the reports of those travellers, together with the accounts given by Bishop Steere and Von der Decken further north, it was very evident that the same natural features extended from the Rufigi to the Zambesi, viz. a slightly undulating and irregular country, at one time spreading out in a great plain, at another forming a narrow valley; while small ridges of hills and isolated picturesque peaks diversified the scenery. Geologically the country consisted of metamorphic schists, gneiss, and granite. The schists had been worn away and washed down, forming the plains in the valleys; while the bosses of hard, compact rock had remained as the ridges of hills and isolated peaks. Of course the most interesting part of Mr. O'Neill's journey was the neighbourhood of the mountain range in Makua, and the strange peak Namuli. That range evidently marked the commencement of the central plateau; and as to the peak Namuli, there could be little doubt that it was snow-clad, because Mr. Maples obtained his information about it from sources quite independent of Mr. O'Neill, and the reports of the two travellers were exactly identical. Considering its position, it must be over 16,000 feet high to be snow-clad. He had no doubt that it would prove to be volcanic; and if so, it would form another link in the chain from the Red Sea to the Cape, which had given rise to the volcanic deposits in Abyssinia, at Kilimanjaro, and the enormous series of tufas and lavas which he (Mr. Thomson) discovered round the north end of Nyassa. That line of volcanoes coincided with the line of weakness and dislocation along which the eastern side of the continent had been upheaved. The areas of depression, Nyassa and Tanganyika, were also approximately parallel to the line of dislocation. With regard to the customs of the Makua, there appeared to be considerable differences in the various sections of the tribes. Mr. O'Neill described the tribal mark as a crescent-formed gash on the forehead, with a gash on either side of the mouth. The peculiar mark of those with whom he (Mr. Thomson) came in contact was a horseshoe-shaped mark in relief over the bridge of the nose, and not at all in the form of a gash, while he had never observed the lateral gashes near the mouth. He was not sure that Mr. O'Neill had referred to the use of that peculiar ornament in the upper lip known as the *pelele*. Near the Lujende, the women wore such an ornament, causing the lips to stick out like a duck's bill straight from the mouth, and giving a most hideous aspect to the face. With regard to the belief of the Makua that death is an eternal sleep, if such was the case it was very evident that they differed from almost all the other tribes of

Eastern Africa, whose ideas of a future life were connected with material things, and could hardly be called spiritual. After death a person was supposed to feel pain, hunger, disease, just the same as before; he only took a new material existence, which differed from the present in that, like the wind, it could not be seen, though it was known to exist. They had not as yet grasped the idea of a pure spirit. With regard to their ideas of a God, they admitted that there was a Supreme Being; but they attached no special attributes to it, and did not trouble themselves about it. If anything, they considered that His influences were entirely evil. He had been much amused with the story of the eye-glass. It might appear very absurd to people who were not accustomed to savages, but those who had been amongst them and mixed with them knew that such things frequently had a very extraordinary influence upon them. He himself had found that by judiciously manipulating an artificial tooth he could produce astonishing results. He was looked upon as some sort of an astrologer directing the stars when he was seen to use the sextant; but the most powerful instrument was the photographic camera. He found it almost impossible to get them to stand still for their portraits. They would stand altogether for a time, but the moment he put the cloth over his head they fled, and all bribes and entreaties were in vain. When he attempted to explain the nature of the instrument to them, he found that he only made matters worse; for several of them, from his explanation, got the idea that he was going to take some essence of life out of them, so that he might afterwards be able to do what he pleased with them. By leaving a camera standing alone he had kept a whole village totally deserted for a day. The natives would not approach it at all. The Portuguese spirit of research, until perhaps the quite recent revival, showed a surprising decline. When they were imbued with a belief in the existence of enormous riches and great kingdoms inland, they were unceasing in their inquiries into the state of the interior, producing that very accurate idea of the geography of Inner Africa which was delineated in the maps of the fifteenth and sixteenth centuries. Since then, instead of advancing, they had retrograded, and now it had been reserved for an enterprising Englishman to call attention to the existence of this peculiar peak, Namuli.

The PRESIDENT in moving a vote of thanks to the author of the paper and to Mr. Thomson for his interesting address, said they owed the presence of the latter gentleman at the meeting that evening to his own short-sightedness in not foreseeing that his honest and truthful report about the prospects of coal up the river Rovuma would be unfavourably received by a semi-barbarous sovereign. Instead of prophesying smooth things about the prospects of expected wealth, Mr. Thomson informed the Sultan that that which was stated to be coal was nothing but a sort of bituminous shale of no value at all. Those who knew something about Eastern politics predicted that he would not long remain in favour with the Sultan of Zanzibar, and the result proved that they were correct. However, they had had the pleasure of listening to him, and it was not improbable that they would ere long hear of Mr. Thomson's being engaged in works of still wider research than those which he had already accomplished. It was very satisfactory to hear that a man of such enterprise and evident powers of observation as Mr. O'Neill was still occupied with the exploration of that unknown country. Part of the business of the Council of the Geographical Society that day was to vote a number of instruments for his use, in order to enable him to make more accurate observations in the future than he had been able to in the past. In doing so they not only assisted a very enterprising traveller, but also a very economical one; because Mr. O'Neill appeared to have this point of resemblance to Mr. Thomson, that he contrived to make very important investigations on very economical principles—a great contrast to some explorers. He was informed that Mr. O'Neill's journey of three months' duration, which had

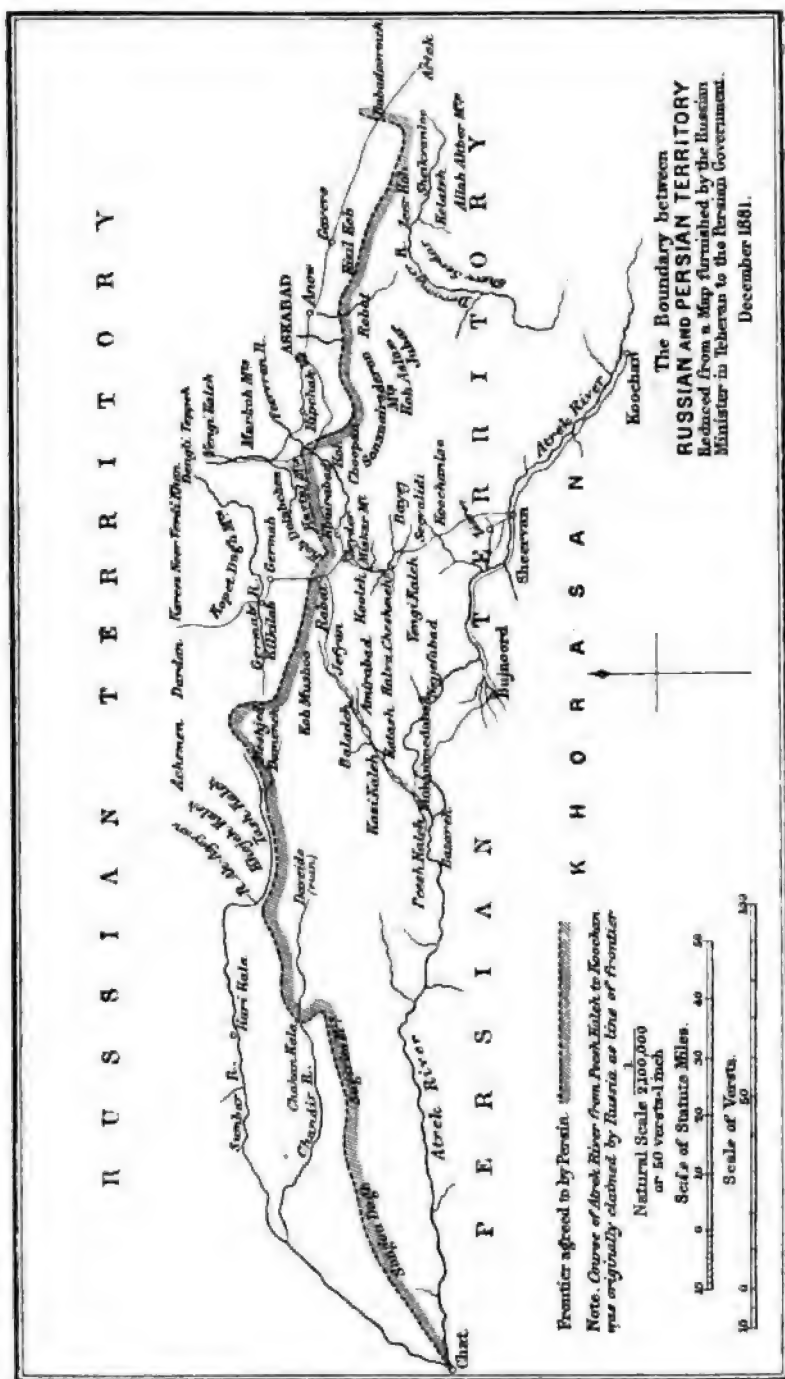
just been described, cost only some 200*l.* ; therefore a very considerable addition to our knowledge of the district might fairly be expected from him at the smallest possible outlay. It was satisfactory to them that this region, which had long been nominally possessed by a European race, had been opened up by an Englishman, and that three concurrent attempts to make known the district had been conducted by our countrymen, and by men who had never sullied the career of honourable enterprise by one harsh act or one deed of which their countrymen need be ashamed. The acts of such men as Mr. O'Neill, Mr. Maples, and Mr. Thomson were likely to add to the honour and credit which the English name enjoyed along the whole of that coast.

The New Russo-Persian Frontier east of the Caspian Sea.

AN important Parliamentary Paper (Central Asia, No. 1, 1882) has just been published, containing despatches from Sir Edward Thornton, Her Majesty's Ambassador at St. Petersburg, and Mr. Ronald P. Thomson, Her Majesty's Minister at Teheran, on the subjects of the Trans-Caspian railway and the Treaty defining the Russo-Persian boundary line which was signed at Teheran on December 21st, 1881. These documents contain matters of much geographical interest.

After the annexation to Russia of the Tekke Oasis, a precise delimitation of the frontier in Khorassan was considered to be necessary, and M. Ivan Zinovief, Russian Minister at Teheran, was directed last autumn to open negotiations with the Persian Government on the subject. The Russians having somewhat moderated their pretensions in the course of these negotiations, a Treaty, defining the Akhal-Khorassan boundary, was signed as stated above.

By the first article of the Treaty the frontier-line is fixed as follows:—"Beginning at the Hasan Kuli Gulf, the course of the river Atrek serves as the frontier as far as Chat. From Chat the frontier-line follows in a north-easterly direction the ridges of the Songou Dagħ and Sagirim ranges, thence extending northward to the Chandir river, reaching the bed of that river at Chakan Kala. From Chakan Kala it runs in a northerly direction to the ridge of the mountains dividing the Chandir and Sumbar valleys, and extends along the ridge of these mountains in an easterly direction, descending to the bed of the Sumbar at the spot where the Ak-Agayan stream falls into it. From this point eastward the bed of the Sumbar marks the frontier as far as the ruins of Meshjed Dameneh. Thence the road to Durrun [?] forms the frontier-line as far as the ridge of the Kopet Dagħ, along the ridge of which the frontier extends south-eastward, but before reaching the upper part of the Germab Pass, turns to the south among the mountain heights dividing the valley of the Sumbar from the source of the Germab. Thence taking a south-easterly direction across the summits of the Misino and Chubest mountains, it reaches the road from Germab to Rabat, passing at a distance of one verst to the north of the latter spot. From this point the frontier-line runs along the



ridge of the mountains as far as the summit of the Dalang [?] mountain, whence, passing on the northern side of the village of Khairabad, it extends in a north-easterly direction as far as the boundaries of Geok Keital [Kaytal?]. From the boundaries of Geok Keital the frontier-line crosses to the gorge of the river Firuzé, intersecting that gorge on the northern side of the village of Firuzé. Thence the frontier-line takes a south-easterly direction to the summits of the mountain range, bounding on the south the valley, through which the road from Askabad to Firuzé passes, and runs along the crest of these mountains to the most easterly point of the range. From here the frontier-line crosses over to the northernmost summit of the Aselm range, passing along its ridge in a south-easterly direction, and then skirting round to the north of the village of Keltechina, it runs to the point where the Ziri Kou and Kizil Dag mountains join, extending thence south-eastward along the summits of the Ziri Kou range until it issues into the valley of the Baba Durmaz stream. It then takes a northerly direction, and reaches the oasis at the road from Gavars to Lutfabad, leaving the fortress of Baba Durmaz to the east."

We give on the opposite page an engraving on a reduced scale of the map of the new frontier, furnished by the Russian Minister for the information of the Persian negotiators, and reproduced in the Parliamentary Paper. We have found it impossible to trace with even approximate accuracy the line of the new frontier on the latest and best map of the region, viz. that of Colonel Stewart, published in the 'Proceedings' R. G. S. for last September. This arises partly from the very different position given to Askabad and its neighbourhood, viz. 30 miles further north than it is on Colonel Stewart's map, and partly from the absence of hill-shading and the many evident inaccuracies in the names of places. For a more accurate knowledge of the boundary, as a question of geography, we shall have to wait for the survey which is contemplated by the second article, in which it is provided that special commissioners shall be appointed with a view of accurately tracing on the spot the frontier-line, and of erecting proper boundary-marks. It is added that the Nasseer-el-Dowleh will represent Persia in this matter.

By the third article it is provided that "whereas, the forts of Giamab [Germab] and Kulkulab [Kilkilab], situated in the gorge through which the stream watering the soil of the Trans-Caspian province passes, lie to the north of the line which, in virtue of Article I. of the Convention, is to serve as the boundary between the territories of the two high contracting parties, the Government of His Majesty the Shah engage to evacuate the said forts within the space of one year from the date of the exchange of the ratifications of the present Convention, but shall have the right during the said period to remove the inhabitants of Giamab and Kulkulab to within the Persian frontier, and to establish them there. On its part, the Government of the Emperor of All the Russias engage not to erect

fortifications in these said localities nor to establish any Turkoman families therein."

The fourth article states that "whereas, the sources of the river Firuzé, as well as of other streams watering the soil of the Trans-Caspian province contiguous to the Persian frontier lie within the Persian territory, the Government of His Majesty the Shah engage, on no account whatever, to permit the establishment of fresh settlements along the course of the said streams and rivulets from their sources to the point where they leave Persian territory, and not to extend the area of land at present under cultivation, and under no pretence whatever to turn off the water in larger quantities than is necessary for irrigating the fields now under cultivation within the Persian territory. With a view to the immediate observance and fulfilment of this stipulation the Government of His Majesty the Shah engage to appoint a sufficient number of competent agents, and to subject any infringer thereof to severe punishment."

The fifth article refers to waggon roads, and it appears that under this it has been proposed to Persia to construct a road from the Akhal frontier to Kuchan and Mash-had.

On the subject of railway construction in the Russian Trans-Caspian territory, Mr. Consul Michell at St. Petersburg reported to Sir E. Thornton on November 18th, 1881, that he had been "informed by a Russian officer, who is employed in the construction of the Trans-Caspian Railway from Krasnovodsk to Kizil-Arvat, that a careful survey of the line of country by a staff of engineers under the direction of M. Uskevitch, with a view to the construction of that line from the latter point to Askabad, had been completed. The accomplishment of the contemplated prolongation of the railway, extending as it does over a distance of 220 versts (equal to about 146 miles), is said to present no great physical obstacles; the only difficulties which it is expected will be encountered during the completion and maintenance of the line will be those proceeding from swollen mountain torrents, bringing down at certain seasons of the year a considerable body of water."

The most interesting information, however, on the subject of the railway question, which is likely to assume great importance in the future, is furnished by an article in the *Novoe Vremya* of February 15th on a paper read before the Imperial Geographical Society of St. Petersburg by M. Lessar, a Government engineer, on the country recently traversed by him between Askabad and Sarakhs. The following is an abstract of the article:—

As is well known, the railway was completed to Kizil-Arvat in the month of September (1881), and, although the question of extending it beyond that point through the oasis had not yet been finally settled, it was nevertheless decided to make surveys of the country in the direction of Askabad, and beyond to Sarakhs. Of special interest was that part

of the country that lies between the above two points (about 180 miles), and extends beyond the limits of the Akhal Tekke territory and along the Atok as far as Merv. The present tranquil state of the region greatly facilitated surveying operations, which, under ordinary circumstances, would have been attended with considerable risk.—M. Lessar was escorted by one officer and twenty-one Cossacks, while the manual labour of levelling was performed by nine Russian workmen and two overseers engaged for the purpose; the guide of the party was Anageldy-Sirdar, formerly a robber chief, and the terror of the Persians and all caravans; the interpreters were a Kurd and a Kazan Tartar.

The work of surveying was commenced in the month of October. The line of route passes through the following principal settlements:—Annair, Giaurs, Baba-Durmaz, Lutfabad, Kaakha, Hojamed, Dushan, Chardei, and Sarakhs. The whole of this road trends in a south-westerly direction,* and runs at a short distance from the Kopet-Dagh and Kelat Mountains, and along an almost entirely flat country. It is only between Askabad and Annair that sandy hillocks of small elevation are encountered, and then these only extend for a distance of 600 yards. Between Annair and Giaurs the road extends along a very sloping declivity, and apparently it is only here, in M. Lessar's opinion, that embankments and earthworks for the railway would be found necessary. Annair is the only settlement in which traces of buildings with any pretensions to art are encountered; these consist of ruins on a large scale of a mosque, the walls, foundations, and minaret of which are in a state of dilapidation; the building is faced with glazed tiles of elegant design, which are in a good state of preservation.

While pursuing his journey, M. Lessar met with Tekke caravans returning from Merv to the Akhal country, which they had been induced to do by the persuasions of Tykma Sirdar, and partly in consequence of the scarcity of water and available land for settlement in the Merv oasis. These Tekkes, as also the inhabitants of the villages passed through, did not molest the Russian party; on the contrary, they gave M. Lessar and his escort a friendly reception, and seemed to be satisfied with the results of the recent campaign. Discontent was only evinced by the rulers of the neighbouring districts, who, since the conquest of the Akhal Tekke oasis, are no longer able to play the part of protectors of the northern frontiers of Persia, and consequently find their functions at an end.

Commencing from Baba-Durmaz, the road in some parts runs through localities overgrown with bushes; ruined forts and watch-towers, erected for the purpose of serving as refuges against marauding parties, as also large artificial mounds, are frequently met with. The

* The direction of the route from Kaakha to Sarakhs, entered on the map, from inquiries made on the spot, as running from west to east, really deflects to the south-east; by point of compass the direction is 55° south-east.

opinion expressed by Vambéry that these mounds mark the burying-places of celebrated warriors and sirdars is not confirmed by the natives. The latter point out special tombs of this description, and say that the mounds were raised in remote times by an unknown race. M. Lessar states that the mounds are 42 feet in height, and sometimes more, of circular shape, and occasionally of elliptical form; they are also seen of a confused style of structure, having at times a diameter of 300 feet, and resembling in appearance the artificial mounds scattered over the central parts of North America. It must be supposed that these mounds were raised by a race that populated Central Asia before it was occupied by its present inhabitants.

Referring to the trade of the Atok, M. Lessar gives the following description of the bazaar of Lutfabad, which, he says, is considered the most important one in that part of the country. Besides provisions and fodder, all the shops contain raisins, nuts, sweets, rice, sugar, tea of inferior quality, and writing paper of Russian manufacture. As regards contents, one shop closely resembles all the others. Along the walls are hung in small bags hair and finger-nail dye, drugs, amulets for man and horse, and also small miscellaneous wares, such as looking-glasses, phials, apparently of Persian manufacture, &c.

Nearly the whole extent of country surveyed is extremely fertile, and abounds in game, such as wild boar, pheasants, &c. Settlements occur frequently along the road, where they sometimes extend in triple line; the most considerable being that of Kaakh, which consists of 600 habitations. The inhabitants are Aliélé Turkomans, who fled from Khiva after the occupation of that khanate by the Russian troops. Generally speaking, the population is a mixed one, and of comparatively recent origin. In consequence of a scarcity of water and an impoverishment of the land in Merv, the Tekkes have been obliged to settle along the streams of the Atok, which take their rise in the Allah-Akber Mountains. In some places the Persians attempt to levy taxes, and the Tekkes, in return, have recourse to pillage. The claim of Persia to the Atok is, according to M. Lessar's view, a very doubtful one.

The food of the Tekkes consists of well-prepared pillaus and of game; also of fermented camels' milk, melons, and water-melons. They use their fingers in conveying food to their mouths, but guests are provided with spoons. The unfavourable accounts given by Vambéry and O'Donovan of the diet of the natives are thus not in accordance with facts.

Between Hojamed and Dushak the soil is much burrowed by porcupines, and large ant-hills abound. Half-way between Chardei and Sarakhs the route is intersected by the road that leads from Merv to Mash-had. In this part of the country high mounds of sandy argillaceous formation are frequently met with, and tall bushes cover the country. Sarakhs is a large Persian fortress, and is occupied by a battalion of infantry (about 700 men), with six old guns in very bad condition.

The fortifications are spread over a considerable extent of ground, owing to the fields and gardens being situated within its walls. The Sarakhs-daria, which rises in the Paropamisus, is generally dry all the year round; the place, therefore, is dependent for its water-supply on wells and a canal from the river Tejend. The levels taken both for the railway already constructed and through the country above described, show that there is no elevation of the land from the Caspian. In the neighbourhood of Uidin the country is even 12 feet lower in level than the Caspian. There is also no ground for assuming that the whole of this locality is the bed of an ancient river.—Judging from the character of the country traversed by him, M. Lessar is of opinion that if levels were taken of the country between Khiva and Bokhara, many localities would be found in the Trans-Caspian desert (which formed in ancient times the bed of a sea) of lower level than that of the Caspian. This supposition leads him to the conclusion that the Murghab and Tejend did not flow into the ancient Oxus, but, like that river, into the Caspian, the shores of which were then in close proximity to these rivers.

On the termination of his mission, M. Lessar returned to Askabad by way of Mash-had and Mahomadabad.

*Lieutenant Kalitin's Journey across the Turkoman Desert from
Geok-tepeh to the Khivan Oasis.**

THE chief interest attaching to the following narrative is due to the fact that it includes a detailed description by an eye-witness of the old channel or southern arm of the Oxus, of which so interesting an account was given by Sir H. Rawlinson in the 'Proceedings' of the Society for 1876 (vol. xx. p. 176). The route followed by the author, Lieutenant Kalitin, leads from the Akhal Tekkeh oasis at Geok-tepeh to Khiva, past the ruins of Zmukshir viâ Mamet-diar, Derbent, Sheikh, Laila, Kizil-cha-kuyuss, and Chagil wells. The time occupied in the journey was from the 7th to the 19th February, 1881. From Kunia-Geok-tepeh the road lay across fields, winding between sloping sand-hillocks covered with a prickly kind of bush, and passing occasionally over small irrigating dykes constructed to collect the little water there is in this almost rainless region. After about two miles the fields came to an end, and the road led through hillocky ground ascending and descending mounds of sand. The only vegetation in these arid tracts is *saksaul* and a bush-like plant called by the Kirghiz *djuzghun*. In the midst of a clay flat or *takir* are the wells of Mergen, distant about 25 miles from Geok-tepeh. There are four of these 56 feet deep, with from two to three feet of bitter saline water, drunk only by thirsty animals, but

* Translated from the *Izvestiya* (Bulletin) of the Russian Geographical Society, vol. xvii. part 4 (1881).

unfit for man. More hillocks of drift sand overgrown with two species of saksaul, and an occasional clump of dry feather-grass, have to be passed before arriving at Katti-got, where the water is bad. At Ilek-salesh, however, on a wide expanse of level ground under lofty overhanging sandhills, visible 10 miles off from the direction of Mergen, there are five wells containing water, which, though brackish and unpleasant to the taste, is fit to drink and make tea of. These wells are lined with saksaul wood.

From Ilek-salesh the road lay through deep drift sands, with frequent ascents and descents, difficult for camels as well as horses, and hardly discernible except where the ground was hard clay, amid sand-hillocks of every conceivable size and shape. Fuel, however, was abundant.

At a large reddish clay flat are the three wells of Utik, 84 feet deep, but only fit for watering camels, and the same may be said of those of Djakin. Between Utik and Mamet-diar the country changes, the sand is firmer and is knit together by bushes. Mamet-diar is a broad level expanse with a burial-place, and four wells 70 feet deep, containing a small quantity of slightly brackish but drinkable water, surrounded by steep hills of bright yellow sand. Here the road bifurcates, one branch, that followed by Lieutenant Kalitin's expedition, leading to the north-west, another going almost due north-east to Kizil-sakal and Mura-chuli, but this has been apparently abandoned as impracticable, owing to the enormous distances between the wells. From Ilek-salesh to Mamet-diar the distance cannot be less than 26 miles, making altogether 74 miles from Kunia-Geok-tepeh. The wells of Karadji, which come next, are a mile to the right of the road, and on a level with it; their water is saline and unpalatable. From Mamet-diar to this point the road crosses high parallel ridges with easy gradients on both sides covered with loose sand, and is marked by occasional heaps of dry saksaul and bones of animals. The guides say that five miles to the left are the two brackish wells of Suyun-uyu.

After this, difficulties increase, owing to the great depth and looseness of the sand and the steep gradients. Horses sink knee-deep in this yielding soil, and the bones of those that have perished strew the surface, especially near the summits. Were it not for occasional hard clay flats, it would be next to impossible to proceed. Farther on the ground is more level, and as the road approaches Derbent the tomb of a saint, with remains of brick buildings, are to be seen. Four wells here occupy the centre of the clay flat; they are 84 feet deep, and when cleaned out the water reaches up to a man's waist, and is remarkably clear and sweet to the taste. The distance from Mamet-diar to Derbent is 50 miles, and there is plenty of stunted arborescent vegetation, djuzghun and feather-grass, to serve for fuel.

From Derbent wells to Khiva there are three routes :—1, due north-

east, passing the wells of Kizil-takir; 2, more east, via Damla; and 3, north-west to Sheikh. The last was that followed by the author.

About six miles from Derbent are three or four neglected wells known as Kara-astchi. The country consists of deep valleys crossed by ridges, which the road ascends, descending through deep drift sands, in several places entirely bare. The vegetation was much as before, and forage was scarce. The sandhills beyond Derbent vary in height from 200 to 350 feet; on their highest points are piled heaps of saksaul. Next come the wells of Tanderli, said to have once contained sweet water, but now choked up, as are those beyond of Usta-turda. From the last-mentioned the road rises perceptibly, now hidden in the hollows between the ridges, now seen on their summits, and about five miles before reaching the Sheikh wells passes through frequent patches of level clay; it then takes a downward direction and becomes less uneven. Six miles to the right a row of high hills is seen, and soon after the takir or clay flat of Sheikh, also the burial-place of a saint, is reached, with a dilapidated hut and ten wells. Of these, however, only two contain water, clear and sweet, but having a slight taste of sulphur, which has been obtained here in quantities, as may be seen by the numerous pits dug close alongside. Eight years ago these wells are said to have contained enough water to supply twenty flocks of sheep of 300 to 600 head in each, and yet leave enough for the wants of a caravan. Reckoning that each sheep which has gone a long time without water will drink a vedro (2.7 gallons), and taking the minimum number in a flock at 300, the wells of Sheikh must formerly have supplied 6000 vedros without running dry. Four or five new wells might be dug at Sheikh, which once marked the frontier between Khivan and Akhal Tekkeh territory.

A mile from Sheikh the road crosses the old southern channel of the Oxus, called the Charjui-daria, which at first sight looks more like a desiccated lake-bed, so much is it altered by sand-drift. The channel is 2100 feet wide, the left bank low, the right steep and hilly, resting on a solid substratum. After crossing it, the road passes at the foot of a high mound, from the summit of which it is evident that the channel describes an elbow. Five miles towards Charjui gigantic sandhills margin the channel on either side. These hills on the right bank continually diminish in size, and at length sink into the surrounding country. Leaving this mound and proceeding half a mile along the right bank, the road again descends into the desiccated river-bed, which it follows for about 15 miles between well-defined banks, the left being low and the right hilly; the width nowhere exceeds 2500 feet, and is never less than 700 to 800, though narrowed in places by drift sand, especially from the left bank. The channel is in several places entirely obstructed by enormous piles of sand, which have slipped down from either side and met in the middle,

forming dams, or as the natives call them *kyri*, some rising to a great height so as to be almost on a level with the right bank. The process may be witnessed at the present day in all its stages, from the time when miniature hillocks begin to link together the opposite banks. These obstructions, which are most frequent along the left bank, make it appear as though the channel were ended, and it is only on climbing to the top and again descending that one is convinced of being still in the former river channel. The right bank is throughout the higher of the two, and assumes all kinds of curious shapes.

The subsoil is clay, regularly stratified, red, white, yellow, and blue in colour, limestone, and a reddish stone. The right bank here and there has been washed by the streams into waves of particoloured clay, mostly white and yellow. The bottom of the channel is smooth, bare, and destitute of vegetation, with occasional takirs, red clay tracts, and saline marshes. Here and there solid sandstone, shingle, and large white boulders underlie the sand, at other places the bottom is pebbly, with coarse, bright sand, and flint. Mica too is frequently seen, and the sand is mixed with quantities of minute shells. Large white flagstones crop out in places. There are deep as well as shallow parts of the channel, and some to all appearance have once formed rapids.

The road, after following the river channel for 15 miles, mounts near three hills by a succession of ascents the high right bank, and turns due north, leaving the river-bed on the left. The native Turkomans call it *Daria-lyk*, a name also applied to the old Oxus bed in the Khivan oasis, and declare that the river Amu once flowed down it to the Caspian. For about three miles the road crosses a stony plateau before again entering the drift sands, and passes a succession of lake beds, some of great depth, but having none of the characteristics of the river channel we have described. This is a most difficult march, huge ridges of sandhills have frequently to be crossed, covered to their crests with bare sand-drift, in which horses sink up to their knees and camels above their fetlocks, rendering it impassable in hot weather. The direction of the road is only marked in the hollows and lake-beds; on the sand-ridges all depends on the instinct of the guide and his power of recognising some indications of the way, it may be a few branches of *saksaul*, or a pile of bones of camels, horses, sheep, or human skeletons, speechless testimony of the difficulties to be encountered. Seven miles before the wells of Laila are reached, the ground rises, and immediately before the wells are three deep lake beds close together; at the further side of the last of these stands a sandhill, and at its foot are the wells. The long level space on which the three wells are situate is 300 paces wide, and would hold twenty new wells without draining one into the other. At present one of the three is choked, and another is in process of decay, the woodwork having fallen in. The water here is brackish, the grass and bush vegetation growing in abundance. From Sheikh to Laila the distance is 78 miles.

On leaving the last-mentioned place, the road again rises and passes through drift sands interspersed with clay flats. Twenty-seven miles from Laila more great sand-ridges have to be crossed, many of them from 700 to 800 feet high, with steep sides and general north-east direction, and separated by lower ridges and flats, all of which must be overcome by the traveller. This is the worst part of the whole journey from Geok-tepeh to Kizil-cha-kuyuss. Farther on, by a group of four hills, the road improves, becoming more level as the clay flats are more frequent, and continues so to Kizil-cha-kuyuss (red wells), six in number, situate in a deep hollow. At its entrance is an abandoned Russian fort. The wells now are neglected and are fast becoming covered with sand. A mile further the road joins the great highway to Khiva, one branch taking a north-east direction, whilst the other turns sharply to the south-west towards Shah-Senem.

The longest distance performed without water was from Laila wells to Fort Zmukshir, 127 miles, reckoning 73 miles to Kizil-cha, and 37 from Kizil-cha to Chagil wells, also choked, and from these 17 to Zmukshir.

The distances between Kunia-Geok-tepeh and Kizil-cha-kuyuss were divided by Lieutenant Kalitin as follows :—

From Kunia-Geok-tepeh to Mamet-diar wells	74 miles.
„ Mamet-diar to Derbent	50 „
„ Derbent to Sheikh	79 „
„ Sheikh to Laila	79 „
„ Laila to Kizil-cha-kuyuss	74 „
<hr/>	
356 miles.*	

According to the native-Turkomans this road was fifty years ago a well-frequented caravan route between the Akhal Tekkeh oasis and Khiva, but came to be disused owing to the want of water. It is now traversed by small parties or individuals, and occasionally small flocks of sheep are driven along it for sale at Khiva. The largest of the trade caravans numbers no more than fifteen to twenty camels laden with khalats, hides, iron and copper utensils and such-like ware in constant demand among the Turkomans, for there are no fairs or market-places in the Tekkeh country, and all merchandise goes by this route. The Turkomans repair to Khiva for their supplies, bartering their sheep as they formerly did their Persian captives.

Nadir Shah is said to have first laid down this route, and had the

* On comparing these distances and Lieutenant Kalitin's published route-map with Colonel Walker's map of Central Asia and the one accompanying Sir H. Rawlinson's paper on "The Road to Morv" (R. G. S. 'Proceedings,' N. S. i. 224), we find them about one-third in excess; the corrected distance, therefore, between Geok-tepeh and the Khivan oasis would be about 260 miles in a straight line. By the windings of the road, however, it might be considerably more; so that after all said, Lieutenant Kalitin's distances, which are doubtless computed from his rate of travel, may not be far out.—M.

wells dug when he attacked Khiva. On this occasion he fought single-handed with Kazret-polvan, and had to return home wounded, leaving his generals to continue the siege. This was the line of march taken by him with a small escort, and this was also followed by a reconnoitring body of thirty-five Tekkehs who fell unawares on a Russian outpost, but were beaten off with loss. Yomud jigits* were sent in pursuit of them, and had an encounter with the Tekkehs, resulting in the loss of two of their men killed, whose bodies were seen by M. Kalitin between the Derbent and Laila wells.

The route above described is only passable in the early spring or in winter when the sand is more compact owing to damp and cold. Laila wells can supply only 40 horses with water and Sheikh 120 besides men. The road is particularly bad for camels, artillery, and troops of all kinds.

According to the natives, there are two other roads to the Khivan oasis from Derbent wells, one viâ Damla, the other by Kizil-takir, but both of them are almost impassable owing to scarcity of water.

The first of these at one *mezghil*, † or march, passes the two wells of Guz, 80 feet deep, one of which is choked, the other contains sweet water. After this there is no water for five marches, till the wells of Damla are reached, containing very little, though what there is of it is available; the next is nine marches on, at the sweet water lake of Djenga-djan, one march from Khiva, altogether sixteen marches from Derbent to Khiva.

The road viâ Kizil-takir is as follows:—five marches from Derbent to Kizil-takir, two wells 35 feet deep with plenty of good water. From this, twelve marches to Khiva without water. This is the shortest route between Akhal Tekkeh and Khiva, but is used only by predatory bands of Turkomans who pillage the frontiers of Khiva.

GEOGRAPHICAL NOTES.

The Masai People and Country.—We glean the following interesting details regarding the redoubtable Masai tribe and their country, of East Central Africa, from a recent letter of Mr. J. T. Last, of Mamboia:—He says: "There is no doubt that the Masai are a fierce people, but I doubt if they are as brave as they are fierce; that is, they may be fierce enough to attack a party they are sure to defeat, but I do not think they are brave enough to attack where there is a chance of being themselves defeated. A man about to march into their country should have some amount of force, but in my opinion the traveller's

* Jigits are natives employed by the Russians for any special work and who may in time become important auxiliaries in military operations.—M.

† *Mezghil*, or march, without halt on heavily-laden camels from 10 to 17 miles.

strength would lie more in his manner towards and treatment of the natives, than in his guns and revolvers. The traveller should have some acquaintance with the Masai, or if not with the Kikwafi, language; they are so closely connected that an acquaintance with either language would suffice. It is of great importance that a traveller should be able, by speaking the language, to make his wishes really known to the natives. I have generally found that it is almost impossible to get a Swahili to interpret correctly, and this would be especially the case among the Masai, of whom the Swahili are so much afraid: in fact, the Swahili should not be trusted in such case. I believe it would be quite possible for a traveller conversant with the Masai language to penetrate with a well-organised caravan from Pangani or Mombasa, through the Kwafi and Masai countries to Unyanyembe or to Lake Baringo and round the northern side of Victoria Nyanza, to Uganda. A traveller of the right stamp, brave but not bullying, gentle but not cringing, with a knowledge of the Masai and Swahili languages, would, I believe, get through. In organising his caravan, he should take some few more men than he has loads for, in order not to be hindered when any of the men fall sick.—Food, however, for a caravan would be a difficult question in the Kwafi and Masai countries, as these people live on ox flesh and milk, and neglect the cultivation of vegetable food, so indispensable to Zanzibar carriers. The native Warima and Swahili caravans manage in this way:—At starting they are careful not to make up the loads too heavy; about 50 lbs. is the maximum weight. They generally start from Pangani, travel north or west till they reach the borders of the Masai or Wakwafi, and there rest for a time in order to collect information as to the time it will take to cross the Masai country to the point they wish to reach. When the number of days' journey is ascertained, they buy sufficient native flour to serve for the time, each man carrying his flour, about 20 lbs., on the top of his load, sufficient to take him across any part of Masai country south of latitude of Mombasa.—From what I have learnt, the end of the wet season is the best for making the journey, as there is then sufficient water *en route*. I have gleaned from a native the following information regarding one of the routes:—

From Pangani	to Bokwa *	.. .. .	10 days.
„ Bokwa	„ Irangi ..	.. .. .	8 „
„ Irangi	„ Ubugwe ..	.. .. .	6 „
„ Ubugwe	„ Ufiyami ..	.. .. .	3 „
„ Ufiyami	„ Ugurui ..	.. .. .	6 „
„ Ugurui	„ Unyanganyi ..	.. .. .	6 „
„ Unyanganyi	„ Utaturu ..	.. .. .	12 „
„ Utaturu	„ Usukuma ..	.. .. .	15 „

“Food has to be bought at any of the stations from Pangani to Unyanganyi. If the Royal Geographical Society determine to send an

* Vide Mr. Last's map, 'Proc. R. G. S.,' March 1882.

expedition through the Masai country to the eastern side of Victoria Nyanza, I could hire men for it in the Luhiga valley of Nguru.—There is another road from Bokwa,* north direction, to Ukavilondo; but corn is to be got at Bokwa only. The dwarf tribe Wamdidikimo live about three months' march north-west of Nguru."

M. de Brazza's Annexation of Territory at Stanley Pool.—When Père Augouard reached Stanley Pool last year for the purpose of establishing a mission station there, Sergeant Malamine, who had been left behind by M. Savorgnan de Brazza to guard the French flag, met him, and communicated to him a copy of the treaty of annexation which that traveller had made with the native chiefs, and which, so far as we are aware, has hitherto been kept a profound secret. The following are the terms of the treaty in question:—"In the name of France and by virtue of the rights conferred on me on September 10th, 1880, by King Makoko, I have taken possession of the territory between the river Jué and Impila this third day of October, 1880. In witness thereof I have planted the French flag at Okila in the presence of the Ubanghi chiefs, now at Nkuma for purposes of trade, and of the Batéké chiefs Ntaba, Lecanho, Ngaekala, Ngaeko and Jenna, vassals of Makoko, and also of Ngalième, Makoko's official representative in this matter. I have handed to each of these chiefs a French flag, in order that they may hoist it over their villages, in witness of my having taken possession of them in the name of France. These chiefs, having been officially informed by Ngalième of Makoko's decision in the matter, bow to his authority, accept the flag, and by their marks affixed to this instrument, testify their adhesion to Makoko's cession of the territory.—The Sergeant Malamine, with two sailors belonging to the crew of the *Cordelière*, remains to guard the flag, and is provisionally appointed chief of the French station of Nkuna. By forwarding to Makoko this document, executed in triplicate, to which my signature and the marks of the chiefs, his vassals, are affixed, I formally notify him of my taking possession of this part of his territory for the establishment of a French station. Done at Nkuna, in the Kingdom of Makoko, this third day of October, 1880.—Signed: Pierre Savorgnan de Brazza, Second Lieutenant in the Navy. + Ngalième, + Lecanho, + Ntaba, + Ngaeko, + Jenna."

Lake Nyassa.—In May 1875, Mr. E. D. Young, R.N., left England in order to found a mission station on the southern shores of Lake Nyassa, for which purpose the friends of Dr. Livingstone in Scotland had subscribed about 12,000*l*. In the latter part of the same year the little steamer *Iala* was launched on the lake, and the settlement of Livingstonia was successfully founded at Cape Maclear.† For six years this place has remained

* Vide Mr. Last's map, 'Proc. R. G. S.,' March 1882.

† See 'R. G. S. Proceedings' (Old Series), vol. xx. pp. 15, 445.

the headquarters from which the Rev. James Stewart, Mr. James Stewart, C.E., and the Rev. Dr. Robert Laws have from time to time started to make various expeditions through the country on the western side of the lake, the geographical results of which have been duly recorded in our publications. But for a long time past, we believe, it has been felt that the locality at Cape Maclear was on various grounds ill-suited for a European settlement, and careful search was made for a healthier and more suitable locality. This was at length found at Misangi Point, where a sub-station, called Bandawé, has been formed in about S. lat. $11^{\circ} 56'$, E. long. $34^{\circ} 6'$.^{*} In his latest letter, dated October 28th, 1881, Dr. Laws has reported the removal of the headquarters of the mission from Cape Maclear to this more healthy and central port and promontory of Bandawé. The old settlement, however, will still be maintained as an out-station, and will presumably be left in charge of natives, but we have at present not heard what will be done with regard to the name "Livingstonia."—Very unsatisfactory intelligence has been received by the same mail in regard to the continued fall in the water-level of Lake Nyassa and the river Shiré.† The *Ilala* on her last voyage down struck on a strip of boulders in the Upper Shiré, and though only one plate was injured, water leaked into the engine-room through two holes. As it happened, the *Ilala* was to have been docked in any case, so that no great harm was done. As the Lower Zambesi had begun to rise, and the rains were due at Lake Nyassa, it is now hoped that by the time when the *Ilala* comes out of dock, both the lake and the river may have risen sufficiently to obviate further difficulty. Still this continued sinking of the water of the lake is becoming a serious matter. Accurate observations have been made for some years past, on the changes in the water-level, and these will prove of much practical as well as scientific importance.

Dr. Junker's Journey in Central Africa.—Dr. Schweinfurth has communicated to Lord Houghton, with a view to publication in our 'Proceedings,' the following news of the progress of Dr. Junker's expedition in Central Africa:—"Geigler Pacha writes to me from Khartum, on the 23rd January, giving me the contents of a letter which he had received from Lupton Bey, Governor of the Bahr el Ghazal provinces, dated the 25th of December previously. Lupton, the successor of Gessi, had left Khartum on the 12th of October, on board a small steamer for Meshra, the port on the Bahr Ghazal at the point where this river ceases to be navigable. From there Lupton wished to proceed to the Zeribas of the district under his administration, but before he could do this he was obliged to send the steamer back to Khartum. The letters from Dr. Junker which were waiting at the

^{*} See Mr. Jas. Stewart's "Route Survey on the Western Side of Lake Nyassa" (northern portion), in vol. ii. p. 464.

† See vol. iii. p. 310.

interior stations could not at that time be despatched to Khartum, and the news regarding the traveller sent down by Lupton Bey was therefore only such as he had obtained by verbal information during his stay at Meshra. Lupton Bey writes as follows:—"Dr. Junker has lately been to Jebel Amadi (the "mountains of Madi" of Dr. Schweinfurth's map) in the Niam-niam country. M. Bohndorf, his travelling companion, who had remained in charge of stores at the dépôt, was at the residence of Sassa, chief of the Niam-niam. Junker made a five days' journey towards the west of the Uelle, as far as a river named Maqua, in the country of the Sultan Kayambaro, whose residence is situated on an island in the middle of the river, which is at that part very wide. According to information received from the people of Sassa the Maqua further on joins the Uelle on the south.—At Khartum another steamer was expected from Lado by which more complete news was looked for regarding the proceedings of Dr. Junker. It was also intended soon to send a steamer again to the Ghazal river which would bring back the long expected letters from this adventurous traveller."

The Expedition of the Jesuit Missionaries to Umzila's Country.—In our July number of last year* we mentioned that Frère Desadeleer had contrived to reach Urgan, the first of Umzila's villages, in his endeavour to take the waggon containing the stores of the expedition to Umzila's kraal. Here it was eventually abandoned on December 17th, 1880, but was presumably left in charge of Umzila's people. Frère Desadeleer afterwards went to Umzila's kraal, but the death of Père Law apparently induced him to return to the waggon at Urgan in company with Père Wehl and Frère Hedley. Subsequent events are described at considerable length by him in a letter, dated Gubuluwayo, October 15th, 1881, of which the following brief sketch will suffice to complete our narrative of the disastrous collapse of the expedition to Umzila's.—It being the height of the rainy season, it was impossible to dream of quitting Urgan in January. Fortunately the kraal there was fairly healthy, and big game abounded in the neighbourhood, but the stores in the waggon melted away rapidly in the months of February, March, and April, and the cloth, &c., used for purchasing maize, millet, milk, &c., was almost exhausted. At the beginning of April, towards the end of the rains, it became absolutely necessary to settle upon some definite plan, as it was impossible to return to Gubuluwayo without paying Umzila what was due to him on various accounts, and the party could not make up their minds to give up to him their waggon and oxen. It was determined at length that Père Wehl and Frère Desadeleer should go to Sofala to purchase provisions and the necessary cloth, &c., and engage porters to bring them back. It was extremely fortunate for them that Père Law on leaving Gubuluwayo had taken with him

* See vol. iii. p. 423.

60*l.* in English gold in order to be able to make purchases from the hunters, and of this a sum of 48*l.* still remained. The two missionaries started for Sofala on April 18th, with some native guides; and at first everything went fairly well, but after a few days the heat became so intense that progress was very slow, and Père Wehl, whose health had long been a cause of great anxiety, became delirious. The town of Sofala was at length reached on May 8th, and the party were received with great kindness by Captain Manoel d'Almeida Coeche, the commandant, who in consequence of Père Wehl's dangerous state lodged them all in his own house. Père Wehl, who now got rapidly worse, died on May 12th, and was buried on the following day.—Frère Desadeleer describes Sofala as a wretched place, consisting of about 200 houses and 1000 inhabitants, who, with the exception of five or six families, are miserably poor, and live chiefly on rice, millet, and fish. There are about twenty white men, the remainder being as black as the Kaffirs, even including the Portuguese half-breeds. The port is much obstructed with sand-banks, and what trade there is is carried on in small vessels with Chiluan and Inhambane.—After the funeral of his companion, Frère Desadeleer, having purchased what he required, made active preparations for his departure. He hired ten Kaffirs as porters, and started from Sofala on May 19th. By pressing on and avoiding all causes of delay, he succeeded in reaching Umgan on June 8th, and he and Frère Hedley at once selected the articles to be sent to Umzila in payment of their debt to him. The Induna of Umgan undertook to take them to the king, and to ask for an escort to conduct the missionaries to the Matabele frontier. The Induna spent a month on his journey, and returning to Umgan on July 24th, expressed Umzila's satisfaction at the articles sent, but said that all his men were absent on military expeditions. The missionaries, having determined not to wait as requested for the escort, on July 28th left Umgan, where their waggon had been detained so many months. Their oxen, which were in excellent condition, crossed frightful swamps without much trouble, and game was abundant for the greater part of the journey. One of the guides killed a buffalo and a hippopotamus, while Frère Desadeleer shot zebras, quaggas, antelopes, and a white rhinoceros, an animal which has become exceedingly rare. By great good fortune the Mashonas were as kind as they had been hostile on the outward journey, and did all they could to clear the road for them. After sixteen months' absence, the missionaries reached their headquarters at Gubuluwayo on October 1st.

Geographical Society of Mozambique.—We have received a copy of the sixth monthly *Bulletin* of this Society, which was founded in the early part of last year, with the laudable purpose of stimulating geographical inquiry among the Portuguese officials and settlers of the East Coast of Africa. The Society is presided over by the Visconde de Paço e d'Arcos, Governor-General of Mozambique, one of the most enlightened

administrators sent out of late years by Portugal to rule over her transmarine possessions. In the present issue of the *Bulletin* we find a long and carefully written article on the river Inhampura or Bembe (the lower Limpopo), with an account of a recent ascent of the river by Senhor Albano Alves Branco, commander of the gunboat *Douro*, which was employed in towing up the river a party led by Senhor Diocletiano das Neves, who was about to found an agricultural and commercial establishment on its banks. The number also contains a short account of an expedition sent to explore Lake Nharrime in the Inhambane district, and an article on the mines of Sofala.

Progress of Mr. Schuver in the Region South-west of Abyssinia.—By a letter dated from Agoldi on the 6th of January Mr. Schuver gives us further news of his proceedings* in the new and difficult region which he has undertaken to explore. During the month of December he visited the country of the independent Berta tribes, who inhabit the deep ravine-like valleys through which flow the Yal and Ror rivers, tributaries of the White Nile, north of the Sobat. The Berta are negroes who go stark naked, and are armed with bows and poisoned arrows. Mr. Schuver succeeded in reaching Kizir and ascended the Banghe Mountains. He also followed the Jaboos river for a considerable distance, down, in fact, to the plains of the White Nile, and was fortunately able to fix the sources of the Yal affluent of the Nile, and to solve the geographical puzzle arising from the circumstance of the Sobat and Jaboos having their source in one and the same lake. He says there are two Jaboos rivers, the word Jaboos, as in many similar instances, being a generic term used, in this case, by some aboriginal people to designate a running stream. The Arabs firmly believe that there is a connection between the Blue and White Niles by means of the union of the respective tributaries south of Fadasi, and that the country between the two Niles is a *Ghezireh* or island, an idea which, although absurd when the great difference in the altitudes of the two basins is considered, is explicable by the fact that there are here two rivers of the name of Jaboos, one flowing to the Blue, and the other to the White Nile. The Jaboos of the Blue Nile has its most southern and principal source at the foot of the lofty Mount Wallel, in lat. 8° 50' N. The most easterly and the chief source of the river Yal (affluent of the White Nile) is in the western valleys of the Shugru Mountains, the eastern base of which is bathed by the Blue Nile Jaboos. As far as the Yal flows through the territory of the Aman negroes it bears the name of Valasat, but after it has passed the Banghe defile in a series of cataracts falling 2000 feet in 12 miles, and reaches the Berta country, it takes the name of Jaboos, the name by which the other permanent river of this country is known. In ascertaining these interesting

* Vide 'Proceedings,' *ante*, p. 44.

facts Mr. Schuver followed the Western Jaboos down to the junction of the Owé, the principal river of the valleys south of Gomashe; thenceforward it passes into the Burus plains, where it takes its final name of the Yal. It contains most delicious fish. Mr. Schuver concludes his letter by a very unfavourable summing up of the character of the Gallas. He finds them "melancholic, avaricious, and unkind," whilst the neighbouring negro tribes are a friendly, jolly, and generous people.

Cape Verd Islands.—In an article contributed to the *Revue Maritime et Coloniale*, M. A. Picquié furnishes some noteworthy remarks and statistics respecting the population of the Cape Verd Islands. The following table shows the striking increase in fifteen years:—

	1844.	1879.
Santiago	20,000	41,076
Fogo	4,000	12,221
Brava	2,000	8,156
Maio	2,500	1,600
Santo Antão	18,000	20,507
São Vicente	300	3,297
São Nicolau	10,000	8,733
Sal .. .. .	..	1,082
Boavista	3,200	2,643
	<hr/> 60,000	<hr/> 99,315

The increase M. Picquié considers to be due to the natural aptitudes of the African race, from whom the islanders spring, and whose athletic forms and vigorous fecundity they have preserved, in conjunction with their primitive character in its more general and striking features. They are, however, extraordinarily indolent, and they are not to be roused from their state of apathy by the recollection of past famines, or the endeavours of the Government. All they are willing to do in the way of labour is to cultivate a few square feet of manioc and some fields of sugar-cane; the former because it is almost their only food, and the latter because they make brandy from it. Drunkenness, however, has not made the same alarming progress among them as in other parts of the world.—Of late years the woods have begun to increase, but very slowly. Some of the islands in the archipelago—Maio, Boavista, Sal, and São Vicente—are dried up, waterless, and bare heaps of dazzling sand, whose only verdure is the orchil lichen, from which a red dye is obtained. These barren islands, nevertheless, have their importance and utility, chiefly in consequence of the salt produced there, which was first worked by the Flemings in the middle of the 16th century. This ancient industry is now, to some extent, falling off, the amount exported in 1878-9 having been 253,110 bushels, about the same as in the year before, but less than the average of the last five years.

Meteorological Observations at Cairo.—From some papers which have been obligingly communicated to us by Major-General Sir F. J. Goldsmid,

K.C.S.L., C.B., we obtain some definite information as to the work of the private observatory at Cairo, to which we recently referred.* The observatory in question has been established by M. Albert Ismalun in connection with the chemical laboratory, of which he is Director, and the records of his observations will, no doubt, become of great value in regard to the climatology of Egypt. The only record at present published is that for last January, and that is necessarily somewhat imperfect, as the necessary instruments were not all in position. We learn, however, that observations will be taken three times a day—at 7 A.M., and at 1 and 7 P.M.—and that the maximum and minimum of temperature will be given for each day, as well as the readings of the barometer and rain gauge, the force and direction of the wind, the condition of the sky, &c. With regard to the month of January, the mean of the daily minima of temperature (converted from Centigrade) was $48^{\circ} 5' \text{ F.}$, and of the maxima $60^{\circ} 5' \text{ F.}$, while the absolute minimum of the month was $37^{\circ} 5' \text{ F.}$, on the 29th, the absolute maximum being $71^{\circ} 5' \text{ F.}$ on the 8th. The absolute minimum of the barometrical readings was 29.97 inches on the 27th, and the maximum 30.3 inches on the 23rd.

International Polar Meteorological Expeditions.—As preparations are now being actively carried on for the despatch of various national expeditions, agreed upon at the International Polar Conference held at St. Petersburg † last August, for taking simultaneous observations in the polar regions, in accordance with the project of our lamented medallist, Lieutenant Karl Weyprecht, the present appears a convenient opportunity for furnishing some information on the subject.—We have already announced the arrival of the two United States' expeditions, under Lieutenant A. W. Greely and Lieutenant P. H. Ray, at Lady Franklin Bay ‡ and Point Barrow § respectively; and in our February number we reported the departure overland of the Russian expedition to the mouth of the Lena. ||—News has just come to hand that the Emperor of Russia has placed at the disposal of the Imperial Geographical Society the sum of 2000*l.* towards the expense of establishing a second station in Novaya Zemlya, which seemed likely to fall through from want of funds. Lieutenant Andreief is to be at the head of this station.

Through the kindness of Captain H. P. Rothe, of the Danish Hydrographic Department, Lieutenant C. Ryder has courteously given us some particulars respecting the Danish expedition. This was originally intended for Upervivik, but its destination was afterwards altered to a more southerly position on the west coast of Greenland, because it was thought that the Americans at Lady Franklin Bay and the Austrians at the Island of Jan Mayen would be too near if the station were placed at Upervivik.

* See *ante*, p. 180, *ad init.*

† See vol. iii. p. 635.

‡ See vol. iii. p. 586, and *ante*, p. 171.

§ See vol. iii. p. 735.

|| See *ante*, p. 91.

By the choice of Godshaab (N. lat. 64°), another advantage was gained, viz. that the station will be in a far better position for observations of the aurora borealis. The expedition is fitted out at Government expense, and under the superintendence of the Meteorological Institute at Copenhagen, the Director of which, Captain Hoffmeyer, is a member and Secretary of the International Polar Commission. The expedition consists of six members:—Mr. A. Paulsen, leader; Mr. L. Petersen; Lieutenant C. Ryder, for astronomical observations; Mr. Hastrup, surgeon; Mr. Petersen, a student of the Polytechnic; and Mr. Neergaard, mechanic; and sufficient assistance will also be provided for the erection of the various buildings. Four houses have been built in Copenhagen for the various scientific departments, and they have already been put up experimentally in Copenhagen to try the instruments and to enable the members of the expedition to practise their use in them. The very best instruments procurable have been supplied to the expedition without reference to cost, and they have been obtained chiefly from Germany and in Copenhagen.—In addition to the obligatory observations, it is proposed that hydrographical investigations and surveys, zoological collections, &c., should also be made as far as time will permit. The expedition will start from Copenhagen about May 20th in the *Ceres*, a vessel belonging to the Royal Greenland Trade, and is expected to reach Godshaab at the end of June. The time between then and the 1st of August, when the simultaneous observations will commence, will be devoted to the erection of the houses and making preparatory observations. It is intended that the expedition should leave Greenland on the return voyage in September 1883.

Professor C. H. D. Buys Ballot, Director of the Meteorological Institute at Utrecht, has courteously furnished us with the following information regarding the arrangements for the establishment of a Dutch meteorological station at Dicksonshavn at the mouth of the river Yenisei. The staff of the expedition will consist of Dr. Snellen, of the Utrecht Meteorological Observatory, as leader, Lieutenant Lamie, of the Royal Dutch Navy, a surgeon, and a naturalist, and all of them will take a share in the meteorological and magnetic observations. It is possible that a sixth member may be added in the interests of commerce, and that in conjunction with Lieutenant Lamie he may attempt to ascend the Yenisei in a steam-launch for the purpose of making inquiries. There will also be five subordinates, including a mechanic, attached to the expedition, which will start about the middle of July. A wooden house has been constructed at Drontheim under the superintendence of the Netherlands Consul, and one of the carpenters employed on it will accompany the expedition. The instruments and apparatus required by the International Polar Conference have been provided, in addition to other instruments, including the remarkable compass invented by the late Professor Stankart.—Should the expedition be unfortunately

prevented by the ice from reaching Dicksonshavn, they will proceed to the north-east point of Novaya Zemlya.—It is understood that the second chamber of the States-General have voted a sum of 30,000 florins towards the expenses of the expedition, while a committee at Utrecht will endeavour to raise the remainder of the funds necessary by means of a public subscription.

The German Government has nominated a Committee, consisting of Professor Neumayer, Captain von Schleinitz, of the Imperial Navy, Dr. Nachtigal, late President of the Geographical Society of Berlin, Drs. Dorgens and E. Hermann, to make the necessary arrangements for the formation of a German meteorological station in the Arctic regions, and they were to meet at Hamburg during the month of March.

We believe that the Austrian expedition will probably be able to leave during this month for the Island of Jan Mayen, where their observatory is to be established, as the fitting-out of the steamer is being rapidly pushed forward. The leader of the expedition will be Lieutenant von Wohlgemuth, who attended the meeting of the Conference at St. Petersburg last August in company with Count Wilczek.

Italian Geographical Society.—It gives us much pleasure to record the substantial progress made by the Italian Geographical Society in point of numbers in recent years. In January 1880 it comprised 77 Honorary and Corresponding Fellows, and 1383 ordinary Fellows, making in all 1460; while in January 1882 the numbers were:—Honorary Fellows 90, Corresponding Fellows 25, and ordinary Fellows 1536, or 1651 members in all. These figures show an increase of 191 members in two years.

Mr. A. R. Colquhoun's Journey through South China, &c., to Rangoon.—Since the publication of our March number * a private letter, dated Canton, January 20th, has been received from Mr. A. R. Colquhoun, stating that he was nearly ready to start, and giving some few details about his route and other matters. He intended to proceed in the first instance to Wu-chow (also called Oo-chow), on the Si-kiang, and a telegram via Hong Kong has announced his arrival at that place, which he was to leave again at the end of February. As the main river is blocked by rapids a short distance above Wu-chow, he proposed to ascend its southern tributary near Sin-chow.—On this is an important town, called Nan-ning, and after visiting it and passing Kwei-teh, the expedition will come to the limit of navigation at Pi-sai (?). Thence, it is reported, some kind of a road or track runs over the mountains in a southerly direction, by way of Tu-fu and Kai-hwa to Mang-hwa, near which M. Dupuis in 1869 found the Song-koi, or Red River, to be impassable. Thence it is proposed by Mr. Colquhoun to cross over to the Black River, an important, though little-known, affluent of the Red River, and so to

* See *ante*, p. 168.

reach Mongla (not far east of Kiang-hung)—a region believed to be exceedingly rich in the precious metals. They will thence proceed southward to Kiang-tsei, where Lieutenant F. Garnier in 1867 was obliged to abandon the Cambodia river. The route afterwards follows a valley to Kiang-hai on the Great Yunnan road, and the expedition will travel along it to Zimmay, which portion was also traversed by McLeod in 1836. From Zimmay it is intended to follow an entirely new road to Rangoon. The shortest estimate of the length of the route above sketched out is 1400 miles, but it will probably turn out to be 300 or 400 miles longer. By far the greater portion of it has never been traversed, but the country along it is reported to be rich in natural products, and is known to be inhabited by a number of interesting aboriginal races.—Mr. Colquhoun appears to have made some changes in his proposed route since leaving England especially as regards his exploration of the Yunnan province, owing to his desire to avoid as much as possible the routes of former travellers; and it is not improbable that local circumstances may necessitate still further modifications.—During his brief stay at Singapore and Saigon, on his way to Canton, our Associate heard of several expeditions being at work in North-eastern Indo-China, but as regards those despatched by M. Le Myre de Vilers, Governor of French Cochin China, we have given our readers later information in our recent reports of the proceedings of the Geographical Society of Paris. In addition, however, Mr. Colquhoun says that Mr. Carl Bock, who was known to be in Siam, has left Bangkok on an expedition towards the Chinese frontier, in order chiefly to make ethnographical and other observations among the wild tribes in that direction. It is believed that Mr. Bock is supported financially and otherwise by the Siamese Government. Northern and even the greater part of North-eastern Indo-China have been up to now almost unknown to geographers, but it may be hoped that the various expeditions now and recently at work there will largely increase our knowledge of an interesting region, and it certainly seems that the most important results of all will be achieved by the expedition of Mr. A. R. Colquhoun and Mr. C. Wahab.

Lieutenant Hammer's Expedition to West Greenland.—Early in September 1879, Lieutenant Hammer, whose labours have been several times referred to in our pages,* left Egedesminde, West Greenland, and proceeded to the fjord of Jacobshavn, in order to study the movements of the ice. This fjord lies in $69^{\circ} 8' N.$ lat., and is one of those which produce the largest masses of ice. It is $16\frac{1}{2}$ miles long from its mouth to the extreme point of the glacier, and it is about $9\frac{1}{2}$ miles from this point to the zone of perpetual ice. The width of the fjord at the narrowest part of the estuary is about $3\frac{1}{2}$ miles, and at the end of the

* See vol. i. p. 520; vol. ii. p. 191; vol. iii. p. 50.

glacier $3\frac{3}{4}$ miles. In the middle of the estuary is a large rock, on which the broken ice from the fjord collects; and the pressure is so great that it causes whirlpools and currents, which drive these masses towards the Bay of Disco. The consequence is that the entrance of the fjord being filled with this broken ice, is not navigable, neither can sledges cross it, as the ice is constantly driven about and smashed by the current.—To reach the glacier, another way has to be taken. About $9\frac{1}{2}$ miles above its mouth, the fjord sends out a branch called Tasiusak, which divides and sends a branch towards the Bay of Disco; between this branch and the Gulf of Disco is a lake navigable like the canal till the end of September. The expedition, therefore, engaged some Greenlanders to carry their boats to this lake, which is named Tasersuak; the lake was crossed, and then the boats were carried 2400 feet further, as far as the canal. This was a most laborious undertaking, the ground rising 207 feet and descending perpendicularly to the fjord. In this way the point was reached where Helland in 1875 had made some observations. At that time the glacier had penetrated $5\frac{1}{2}$ miles further forward than it was in 1850. It was impossible, therefore, to make observations of the fjord from this spot, on account of the great steepness of the heights. The expedition had to content itself with laying down on the map the form of the glacier, and then retraced its steps.—During the long night, which lasts from November to the middle of January, the expedition wintered at Jacobs-havn, and was employed in taking soundings and investigating the saltiness of the water. The average temperature was -22° F.; but when the wind blows furiously from the south it rises to about 14° F.—On the 11th of March the expedition was resumed with two sledges, each drawn by eight dogs; and after several fruitless attempts, a road was found on March 21st partly by the eastern arm of the Tasiusak, and partly by land, to a large lake, the Nunataptasia, which appears to have produced one arm of the fjord. This lake seems to be the receptacle for the snow from the interior, as the water is perfectly fresh; its depth is three feet more at the end of the year than in March, the rise beginning long before the ice melts, when the temperature varies from 23° F. to -4° F., which tends to prove that there is water under the glacier, and that the cold does not reach that depth. In April the ice on the lake was still $5\frac{1}{2}$ feet thick.—The glacier ends in the fjord by a precipitous fall of 200 feet; and it rises to 1025 feet above the level of the sea at the place where it receives the ice from the interior. Its surface is uneven, and intersected by deep fissures; the centre is relatively smoother, but on the sides are rough drifts 50 feet high. Deep fissures separate the central moraine from the sides, which tends to show that the former passes over water, and that the sides rest on rock; the glacier, it is to be remarked, ends in a concave curve, and the

sides extend into the fjord. Its velocity is greatest in the centre, as will be seen by the subjoined observations:—

At 900 feet from the side the velocity is 16·4 feet in 24 hours.					
„ 1750 feet further	„	„	23·9	„	„
„ 1960	„	„	29·2	„	„
„ 2790	„	„	39·8	„	„

The velocity in the centre is about 50 feet.

The height of the ice-bergs varies from 100 feet to 346 feet above the water; according to the mean of the observations made of their total volume, it may be considered that this is equal to eight and a half times the volume of the part that rises out of the water, which gives the mean of from 378 to 510 cubic feet. Evaporation, melting, and the friction of glaciers sensibly diminish their size, which when first formed would probably be equal to a cube of 1000 feet on each side.—Now an iceberg with a surface of 1000 square feet above the water loses by evaporation ·047 per square foot, and by melting ·067 per square foot, or 114,000 lbs. of ice a day, or 2064 cubic feet; added to this loss is that which takes place under the surface of the water, and which is 500 times greater than that in the open air.—With regard to the temperature in the open air and the temperature in the interior of the earth and under the water, a number of careful observations has given the following mean results:—On March 5th at one foot underground the temperature was $-3\cdot46^{\circ}$ F., in the open air it was $-26\cdot5^{\circ}$ F.; on November 10th, at 180 feet below the surface of the water, it was $32\cdot9^{\circ}$ F., while at the surface it was 28° F., and 1570 feet below the surface it was $34\cdot4^{\circ}$ F. On November 3rd the maximum of temperature obtained at a depth of 240 feet, viz. $33\cdot80^{\circ}$ F.; at 420 feet the temperature fell to $32\cdot54^{\circ}$ F., while at 1570 feet it was $33\cdot62^{\circ}$ F.—Lieutenant Hammer also caused some observations to be made on the saltness of the water at different depths. The water in the fjord is less salt on the surface than down below, in the proportion of 3·18 to 3·34 per 100. This difference disappears at the depth of 180 feet; the ordinary degree of saltness is 3·33 per 100, and at a greater depth the water of the fjord is saltier than that of the sea; hence there are two opposite currents.

The whole surface of these regions presents proofs of having been entirely covered with ice in former ages. On the loftiest summits are found fissures and erratic blocks; and on one, which is 1624 feet high, is an erratic boulder measuring 8 cubic feet, exhibiting longitudinal cracks in a west-north-westerly direction.

Lieut. Hammer has recently completed his report on his expedition to Jacobshavn, and the foregoing notes on his labours are taken from a short paper on the subject communicated by Lieut. René Roy to the Geographical Society of Paris.

REPORT OF THE EVENING MEETINGS, SESSION 1881-82.

Seventh Meeting, 27th February, 1882.—The Right Hon. Lord ABERDARE, President, in the Chair.

PRESENTATION.—*James Forrester Anderson, Esq.*

ELECTIONS.—*James Forrester Anderson, Esq.*; *Lieut. John Fulton, R.N.R.*; *S. Leigh Gregson, Esq.*; *Edward Coode Hore, Esq.*; *Henry Davenport Jenkins, Esq.*; *J. G. Macdonald, Esq.*; *George Barnett Smith, Esq.*

At the commencement of the proceedings, the Secretary, Mr. CLEMENTS MARKHAM, announced that the First Lord of the Admiralty had intimated to the Council the intention of the Government to subscribe 5000*l.* towards an expedition in search and for the relief of the *Eira*, commanded by Mr. Leigh Smith, and that the Council had decided to subscribe the sum of 1000*l.* for the same object.

The reply of Mr. T. V. Smith to a letter communicating this intelligence was also read (*vide* "Geographical Notes," *ante*, March number, p. 158).

The following paper was then read:—

"The river Irawadi and its sources." By Major J. E. Sandeman, Bengal Staff Corps.

The paper and the discussion which followed will be published in the May number of the 'Proceedings.'

Eighth Meeting, 13th March, 1882.—The Right Hon. Lord ABERDARE, President, in the Chair.

PRESENTATION.—*The Rev. W. L. Lang.*

ELECTIONS.—*William J. Aldom, Esq.*; *Alexr. Livingston Christie, Esq., R.N.*; *Courtenay H. S. Scott, Esq.*

The paper of the evening was:—

"A Journey in the Makua and Lomwe Countries." By H. E. O'Neill, H.M. Consul, Mozambique.

Vide ante, p. 193.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—February 17th, 1882: M. HENRI DUVEYRIER, President of the Central Commission, in the Chair.—The Chairman announced the return of M. and Mme. de Ujfalvy, who have just accomplished a journey of considerable length in Kashmir and Little Tibet. M. de Ujfalvy had brought back with him an important collection, which was to remain on exhibition for some time in one of the Society's rooms, and afterwards to be presented to the nation and deposited in the Ethnographical Museum at the Trocadero. The collection was of interest not only from a geographical and ethnographical point of view, but also from the standpoint of art and art-history. M. de Ujfalvy, who was present, stated that at an early meeting of the Society he proposed to make some observations on Kashmir and Little Tibet, the latter of which countries had not previously been visited by any French traveller. The region which he and his wife had traversed is a sort of neutral territory where Persian, Hindu, and Chinese art all meet.—The Chairman also called attention to the presence at the meeting of M. E. Cotteau, who has just

returned from his journey across Siberia, along the river Amur, to Japan, Peking, Central China, Tonquin, and Cambodia.—It was announced that the Minister of Public Instruction had forwarded to the Society an unpublished topographical work which had been sent home by Dr. Crevaux, entitled, 'The Survey of the Course of the Rio Colorado,' by Herr Freund, an engineer. Dr. Crevaux himself had also sent from Buenos Ayres an unpublished map of the Rio Vermejo, in the Gran Chaco, an important water-way, which the Argentine Government has recently caused to be examined with a view to ascertaining its navigability, and which will serve as a highway for the products of Southern Bolivia (Tarija) and of the northern part of the Argentine Republic (Salta and Jujuy) to the Parana and La Plata. This map, which is anonymous and dates from the last century, is to be reduced and published in the *Bulletin*. Dr. Zeballos, President of the Argentine Geographical Institute, who had presented the map to Dr. Crevaux, stated in a letter dated January 8th, that he had heard of the traveller's arrival at Salta, and that by that time he ought to have reached the sources of the Pilcomayo, which he intends to descend to its confluence with the Paraguay. Dr. Zeballos had also sent to the Society a number of works on the expeditions to the Rio Negro and Lake Nahuel-Huapi, &c., and he announced his intention of shortly forwarding the first volume of his 'Geographical Description of the Argentine Republic,' which will extend to several volumes.—M. Kuss forwarded a report on the journey to the Zambesi of the mission under Senhor Paiva de Andrada, together with a map which is the most important result of the expedition.—The Governor of Cochin China informed the Society, in a letter dated Saigon, December 30th, 1881, of the departure of two explorers, MM. Septans and Mondon, who propose to visit the region situated between Chelang, on the Upper Mekong, and Quinhone, on the shores of the China Sea. They were to ascend the river named Tombun on M. Dutreuil de Rhins' map of Eastern Indo-China. The same correspondent also announced the return to France of Lieutenant Delaporte, who has just paid a visit to the Khmer ruins of Cambodia, and the death of M. Courtin, a French traveller, who had gone with M. Villeroi d'Angis to examine the Black River (Chong-bo or Kiem-tu-ha), and the Upper Song-koi or Red River of Tonquin.—A letter was next read from Captain Aymonnier, who is just now temporarily in Paris, announcing his approaching return to Cambodia on a mission from the Minister of Public Instruction.—A letter, dated December 10th, 1881, was also read from M. Ledoux, French Consul at Zanzibar, who has just been appointed to a similar post at Mogador, announcing that Mr. Joseph Thomson was on his way back to England, having abandoned his journey to the northern part of the Zanzibar dominions. Some news was also given as to disturbances between Mirambo and his former ally, Simba. In the middle of December the road from Tabora to the station at Karema was reported to be open.—Colonel Veniukof furnished some information respecting a map which he had forwarded, of the new Russo-Persian frontier, and he afterwards informed the Meeting that a new expedition to Central Asia, under Colonel Prejevalsky, was projected by the Imperial Geographical Society of St. Petersburg, chiefly with the object of studying volcanic phenomena in the Tien Shan or Celestial Range. Colonel Prejevalsky would, perhaps, make a further attempt to penetrate into the mountains of Tibet. Colonel Veniukof also stated that the expedition sent to the Trans-Caspian region to explore the ancient bed of the Amu-daria had returned to St. Petersburg, and that one of its members, Prince Guédroitz, had already read before the Geographical Society there a preliminary report on the results of the expedition.—Lieutenant R. Roy presented the report of Lieutenant Hammer, of the Royal Danish Navy, on his expedition to the Jacobshavn Fjord in Greenland, and he also gave a summary of the proceedings at the last meeting of the Geographical Society

of Stockholm, when Baron von Nordenskiöld read a paper, showing that 'there was nothing to prevent annual communication by the Arctic Sea with the mouths of the Obi and the Yenisei. Lieutenant Roy afterwards passed in review the different expeditions intended to found international meteorological stations in the polar regions.—Dr. Hamy, Director of the Ethnographical Museum, presented an album of inscriptions recently collected in the Canary Isles by M. R. Verneau, who is attached to the Muséum d'Histoire Naturelle. The Chairman remarked that he had found in the language of the former inhabitants of the Canaries several Berber words, which showed that there had been a close connection between them and the Berbers and Tuaregs of Northern Africa.—M. Ed. Sayous read a notice of the last work of M. Paul Hunfalvy, President of the Geographical Society of Buda Pesth, on the Hungarians; and M. Alphonse Milne-Edwards, of the Institute, a paper on the investigations in submarine zoology made by the scientific expedition on board the *Travailleur* in 1880–1 off the coasts of the Iberian peninsula, Provence, Corfu, and Northern Morocco. M. Milne-Edwards' memoir will be published in the *Bulletin* with two maps showing the route of the vessel.

——— March 3rd, 1882: M. HENRI DUVEYRIER, President of the Central Commission, in the Chair.—A letter was read from M. Ledoulx, French Consul at Zanzibar, dated January 12th, 1882, stating that no news had been received from M. Ramaeckers, the chief of the Belgian station at Karema, owing to the fact that Mirambo, after defeating his former competitor Simba or Simbo, had remained master of Unyanyembe, and intercepted all communications. An armed body of men has accordingly been sent from Zanzibar to cross Mirambo's lines and to bring back at any cost intelligence regarding the position of affairs at Karema. Mirambo had begun to build a town, to be named after himself, on the caravan road, where consequently Arab merchants and others will have to pay toll. The Rev. Walter Hutley, of the London Missionary Society, had reached Zanzibar from Ujiji, which he had left three months before. From his account the position of missionaries and explorers there is a very uncomfortable one, owing to their treatment at the hands of the fanatical Arabs. M. Ledoulx added that the Protestant mission had been obliged to leave the country, and that Mr. Hutley was returning to England in order to explain the situation to his superiors. Satisfactory news had, however, been received from the French station in Usagara, where M. Bloyet and his wife were both in good health. The Roman Catholic establishments at Bagamoyo and in the neighbouring region were reported to be in a flourishing condition, and it was in contemplation to found two more further inland.—Colonel Veniukof communicated the following items of geographical news:—1. The first part of Colonel Prejevalsky's account of his journey to Tibet and in China in 1876–80 is now in the press. The work will be divided into two parts, and illustrated with a map and 100 engravings of scenery, types, costumes, &c. A German translation will appear immediately after the publication of the Russian text. 2. The last portion of the late M. Fedchenko's travels in Turkistan, devoted to botany, has just been published. 3. A topographer has been sent to Darwaz to join M. Regel; and during the coming summer the topographical investigations on the Pamir will be brought to a conclusion. 4. The discussion has been begun at the Imperial Geographical Society of St. Petersburg on the report of the Commission sent to the Trans-Caspian region to examine the ancient bed of the Amu-daria. From this report by Prince Guédroitz, it appears that some parts of the steppes have been found by the engineers to be below the level of the Caspian Sea. The low level of the country is especially remarkable in the neighbourhood of the Aidin wells. 5. A Russian expedition to Novaya Zemlya, under the command of M. Andréief, is under consideration. 6. During the present year several colonies are to be founded in the basin of the river Amur. Emigrants from the southern provinces

of China intend to colonise the neighbourhood of Ninguta, in Kirin, and of Kunchung; and the Russians will establish several villages between Lake Kangai and the Sea of Japan. 7. The emigration statistics of the Russian empire have just been published, by which it appears that in the decennial period 1871-80 2,807,000 Russians have left for foreign countries, while 2,455,000 immigrants have arrived, thus showing a loss of 352,000, without counting the considerable number of persons who have left their country without legal authorisation. There has been, accordingly, an average annual loss of 35,200 persons, belonging chiefly to the well-to-do classes. Against this a great number of foreigners enter the country and accumulate wealth, there having been, for instance, no less than 406,000 German immigrants in 1880.—It was announced that a National Congress of German Geographers is to be held at Halle from April 12th to 14th, when papers will be read on the Ethnography of Northern Africa by Dr. Nachtigal, on the Island of Sumatra by Herr Hahn, &c.—A letter was read from the French Consul at Haiphong, giving further details respecting the death of M. Julian Marcel Courtin, which took place at Vang-giam, in the Muong country, on December 8th, 1881. M. Courtin had left Hanoi on September 5th, in company with M. Villeroi d'Augis, to explore the Upper Song-koi or Red River. They intended to make a topographical survey of that entirely unknown region, and to collect all possible information on its commerce and industry. They ascended one of the affluents of the Red River, the Black River (Chong-bo or Kien-tu-ha), and under some difficulties succeeded in mapping the country they traversed. M. Villeroi's return journey was a series of misfortunes, for besides the death of his friend, his junk was wrecked, and his provisions, papers, &c., were lost; he intends, however, to publish a narrative of his journey.—At the last two meetings of the Society reference has been made to the recent discovery of curious rock inscriptions, &c., in North-West Africa, the pictorial representations being those of animals long since extinct in the country, such as elephants, rhinoceroses, giraffes, &c. In regard to these, M. Koch has written, stating he was the first to discover the inscriptions during General Cavaignac's campaign in the Ksar region in 1847. He says that they are of very remote antiquity, and certainly anterior to the introduction of Mahomedanism, as the Koran forbids the representation of living things. That opinion is based on the fact that lions and ostriches are still found in the Sahara, while elephants have disappeared since the time of the Romans.—M. W. Huber, the reporter of the Prizes Committee, announced the following as the award of the Society's medals for the year 1882:—(1) A gold medal to M. Georges Revoil for his two journeys in Somali-land; (2) A gold medal to Dr. Oscar Lenz for his journey from Morocco to the Senegal, by way of Timbuktu; (3) A gold medal (the Legerot prize) to Dr. Montano for his explorations in the islands of the Indian Archipelago, chiefly in Lulu and Mindanao; (4) A prize, founded by Madame Boselli, in memory of her father, M. Jomard, the well-known geographer, and awarded now, for the first time, to M. Gaffarel for his important works on historical geography.—M. Pierre Margry, formerly keeper of the records in the Ministry of Marine and the Colonies, and author of a work on Robert Cavelier de la Salle, called the attention of the Society to the approaching celebration in the United States of the two hundredth anniversary of the discovery by that explorer of the mouth of the Mississippi. The city of Rouen, Cavelier de la Salle's native place, is expected to send delegates to the celebration which will be held at New Orleans on April 9th; and M. Margry expressed a hope that the Society might be induced to record the name of the discoverer among those of other explorers on the mural tablets in their hall.—M. Achille Raffray, French Vice-Consul at Massowah, afterwards read a paper on his journey in Abyssinia and in the country of the Raya Gallas, of which the following is a brief abstract:—The king of Abyssinia lives almost always in the

midst of his army, which he leads at one time against a revolted vassal, and at another and more frequently against the independent Galla tribes; and it was owing to this that M. Raffray, who had to seek an audience with King Johannes, had an opportunity of visiting the country of the Raya Gallas and the Zebul Mountains, regions previously unknown. M. Raffray described first the route which he followed from Massowah to the king's camp, visiting successively the province of Bogos, the plateaux of Tigré, the town of Adowa, and the districts of Geralta and Enderta, and crossing in the Damotkuen district the defiles of Mounts Alaji (9865 feet) and Debbar (10,669 feet). On leaving the last-named point the traveller entered a little-known region, very different from other parts of Abyssinia—the inner basin of Lake Aussa. This region is thickly wooded, and trees unknown elsewhere are found there. M. Raffray visited Lake Ashanghi (8254 feet), which has no apparent outlet. The level of the lake remains the same throughout the year, and its waters run off through subterranean channels. After leaving Lake Ashanghi, M. Raffray began to descend from the Ethiopian plateau to the plains inhabited by the Raya Gallas, who are of the same race as the Abyssinians. After traversing the plain he ascended the Zebul Mountains, a chain of slight elevation and of no great breadth, which are almost entirely isolated from the Ethiopian mountain system. It was there that King Johannes was encamped with his army. From the Zebul Mountains the whole of the Ethiopian mountain system could be seen to the westward for over 70 miles, while to the eastward immense plains stretched down to the shores of the Red Sea, and enclosed the great depression of Lake Aussa, which receives, either directly or filtered through the sand, the water which runs down from the Abyssinian plateaux. M. Raffray remained five weeks at the king's camp, and afterwards went to explore the river Gulima, as he had some doubts as to the direction of its course; he then plunged afresh into the Abyssinian mountains, and ascended up to the lofty plateaux of Mounts Abboi-Miéda and Abuna-Yusef, the passes of which are respectively about 11,400 feet and 13,200 feet above the sea-level. On these plateaux are found the sources of three important rivers,—the Gulima which runs to the east, and flows into the basin of Lake Aussa, the Taccazé and the Tellaré, which, after uniting to the north of Sokota, flow into the Nile. M. Raffray described these lofty summits, on which grows a plant reaching a height of 26 feet, the *Rhyncopetalum montanum*, and on which are found insects similar to those of temperate Europe. He next visited the town of Lalibéla, and stopped a week to examine and sketch some very curious monuments. These are an important archaeological discovery, for their existence in Abyssinia was only suspected before his visit. M. Raffray afterwards crossed the mountains to Mékalé, in Enderta, where King Johannes' camp then was. After a journey of six months' duration he returned to Massowah by the route of the British expedition against King Theodore. Towards the conclusion of his paper, M. Raffray enlarged upon the advantage of not separating the study of geography from that of zoology, especially as regards the lower animals. By their means he has established the existence in Abyssinia of four distinct regions of different altitudes. The first or coast region belongs to the fauna of the Sahara; the second or valley region has a fauna similar to that of the Senegal; the region of the lofty plateaux is more peculiarly Abyssinian, with a strikingly similar fauna to that of the Mediterranean; and lastly, the region of mountain-tops, varying in altitude from 11,483 to 13,124 feet, belongs to the fauna of the mountainous parts of temperate Europe.

— March 17th, 1882: M. HENRI DUVEYRIER, President of the Central Commission, in the Chair.—A copy of the statutes of the Colonial Society of French Africa was received, with an intimation that one of its members would shortly start for the Gaboon.—M. Lessar, a Russian engineer, who surveyed the route for the

Mikailofsky railway as far as Kizil-Arvat, and who has since carried his operations to within a few miles of Sarakhs, communicated an account of his explorations in the Trans-Caspian region.* A summary was next given of the results of the mission to Cambodia, undertaken by M. Delaporte, who has recently returned in ill-health.—The Minister of Public Instruction officially informed the Society that the twentieth meeting of the learned societies of Paris and the departments would take place at the Sorbonne from April 11th to 13th. M. Maunoir expressed a hope that members of the Society would take part in it, adding that communications had already been forwarded. A letter was read from Colonel Veniukof, giving the following items of geographical news:—1. It is said that the Russian Government is about to undertake topographical surveys along the whole of the new Russo-Persian frontier, and that the Shah has given permission for their extension to the province of Khorassan. 2. The Tiflis Alpine Club are about to investigate the glaciers of the Caucasus. In the course of recent levellings in the Baltic provinces of Russia, it has been shown that serious mistakes were made by the astronomer Struve and others in the determination of certain heights. Finally, Colonel Veniukof stated that according to the last census the town of Tokio, Japan, contained 1,064,331 inhabitants.—Letters from Saigon, dated February 3rd, announced the departure for the interior of Indo-China of Lieutenant Gauthier, who proposes, after leaving Bienhoa, to proceed northwards to the latitude of Hué, and to return by the China Sea.—L'École Supérieure des Lettres at Algiers forwarded the first number of its *Bulletin de Correspondence Africaine*, which is to be devoted to the study of the ancient geography of Northern Africa.—In a letter from Kondoa, dated January 28th, 1882, Captain Bloyet complained of various attacks on the men belonging to the French station, in the neighbourhood of which small-pox was also raging with great violence.—It was announced that letters, dated January 7th and 19th, had been received from Dr. Jules Crevaux, who had reached the sources of the Rio Pilcomayo (S. lat. 21°, W. long. 68° 20' 15") in the Republic of Bolivia. On the frontier between the Argentine and Bolivian Republics the expedition had some difficulties with the half-Indian peasantry. With the assistance of Mr. Gould, Director of the Cordova Observatory, they had determined, by telegraph, some very important geographical positions in the Argentine provinces of Salta and Jujuy. By last accounts they were on their way to Tupiza.—Letters were read from MM. de Brazza and Mizon at the Upper Ogowé station, dated November 4th and 8th, 1881. M. de Brazza had just returned from his exploration on the banks of the Congo, of which he gives few details, reserving them, no doubt, for his early return to Paris. He says that, as we have before heard, the route from Franceville to the river Alima is practicable for beasts of burden, and he adds that a small railway might be constructed without difficulty.—Information has been received from other sources that the Lower Ogowé is more and more frequented by a considerable number of traders, who are prevented by the scarcity of canoes from going up to the country below the falls.—A note was read from M. Louis Petit, a naturalist, on the subject of his sojourn at Landaka, West Coast of Africa, which is situated in 5° S. lat., in one of the best positions between the Gaboon and the Congo. The soil there is fertile, the climate usually very healthy, and the neighbourhood charming. He also described the country round the village of Condé, some twelve hours' distance from the coast, as being splendid, abounding in game, and rich from a natural history point of view.—M. Gaumet, one of the Sectional Presidents of the Topographical Society, presented an instrument of his own invention, and gave some information regarding its uses.—M. Joseph Martin, to whose collection of curiosities, &c., allusion was made at a recent

* For an account of M. Lessar's explorations, vide *ante*, p. 216.

meeting, announced his intention of returning shortly to Eastern Siberia, and that he fully intended to visit Kamchatka. His journey will last two or three years.—M. de Ujfalvy addressed some remarks to the Society on the interesting collection of objects of art, &c., which he had brought back from Kashmir and Little Tibet, and also on the various regions visited by himself and Mme. de Ujfalvy.—The meeting was brought to a conclusion by a communication from M. Jules Garnier on the country of the Don Cossacks.

Imperial Geographical Society of St. Petersburg.—February 6th, 1882: M. P. SEMENOF, Vice-President, in the Chair.—A paper was read by M. Lessar on his surveys of the country from Kizil-Arvat to within a few miles of Sarakhs (*vide ante*, p. 216).

New Geographical Society.—We have been notified of the formation in March of a new Geographical Society at Greifswald, in Pomerania. The founders announce their intention of publishing transactions, but do not state when the series is to commence. The following are the principal officers of the Society:—President, Dr. Rudolf Credner, Professor of Geography; Vice-President, Dr. B. Minnigerode, Professor of Mathematics; and Secretary, Dr. Wilhelm Stöwer.

Geographical Society of Rome.—January 26th, 1882.—The sitting was devoted to a report on the financial situation of the Society in 1881, and the announcement of the award of the two great medals of the year to Dr. Nachtigal and Major Serpa Pinto for their explorations, and for their published accounts of the same. Several honorary and corresponding members were elected, the names of our President, Lord Aberdare, and General Sir H. E. L. Thuillier, C.S.I., F.R.S., formerly Surveyor-General of India, appearing in the two classes respectively.

— February 12th, 1882.—Professor M. S. de Rossi explained to the Meeting the method followed in the construction of his seismographic map of Italy, exhibited at the Venice Congress.

— February 26th, 1882: Commendatore GIACOMO MALVANO, Vice-President, in the Chair.—Professor Federico Minutilli delivered an address on “Africa, considered from the triple point of view of Science, Civilisation, and Commerce.” Signor Minutilli first traced in general terms the important work accomplished in late years by travellers of different nationalities, in order to solve the great geographical problems of the country, and he mentioned in particular the names of the Italian explorers who had done their share. Among these he made an especial allusion to the name of Signor Giovanni Succi, who has lately done good work on the East Coast of Africa and in the Island of Madagascar. He, the speaker said, belonged to the class of explorers who study the countries they traverse from a practical point of view. He gave a somewhat minute account of Signor Succi’s journey to Madagascar and the Comoro Islands. In the latter he made friends with the Sultan of Anjuan, the capital, and after obtaining from him an important commercial concession, he returned to Italy to form a company for promoting the exchange of commercial products between Italy and the East Coast of Africa and the adjacent islands. After having explained Signor Succi’s plan and ideas, Signor Minutilli endeavoured to prove the importance of the project and the necessity for entering upon commercial relations with distant places, and above all with Africa.—On the conclusion of Signor Minutilli’s address, the Chairman presented Signor Succi to the Meeting. In a brief speech the traveller said that as Signor Minutilli had referred more particularly to travellers on the East Coast of Africa, he in his turn ought to draw attention to those who had explored the western side of the continent. The most illustrious of these, he said, was Pietro Savorgnan di Brazza, whose mother was present at the meeting.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Cons, Henri.—La Province Romaine de Dalmatie. Paris (Thorin): 1882, 8vo., pp. xvi. and 415, map. (*Dulau*: price 6s.)

The object of this work is to retrace the history, from the earliest times to the death of Theodosius, of the Roman province of Dalmatia, which includes Dalmatia proper, eastern Istria, the Hungarian littoral, a large part of Croatia, the ancient Rascia, Bosnia, Herzégovina, Montenegro, northern Albania, and the Illyrian islands, from the bottom of the gulf of Quarnero to the canal of Otranto. The general aspect and physical geography of this considerable region are discussed separately in the first chapter, and there is a special geographical index, and a bibliography of 82 works by modern authors. The map (scale 1:160,000) shows modern and ancient names by colours.

Strelbitsky, J.—Superficie de l'Europe, établie par J. Strelbitsky (Général d'Etat-Major Russe). Publication du Comité Central Russe de Statistique. St. Pétersbourg (Trenk & Fusuot): 1882, 4to., pp. xx. and 227, maps.

This important official work is an outcome of the International Statistical Congress held at the Hague in 1869, at which a plan for the publication of comparative international statistics was approved, the preparation of different branches being divided between the delegates of the States represented, and the territorial section falling, with others, to Russia.

The Central Statistical Committee of Russia, having corresponded on the subject with competent foreign Institutions, has submitted the material obtained, with the necessary maps, to General Strelbitsky, already well known by his cartographic and other works, especially his "*Superficie de l'Empire Russe*," published in 1874; and that experienced officer has after six years of application produced the volume now under notice, which is divided into six sections, as follows:—1, Superficies of Europe, by countries and administrative divisions; 2, of the European continent by zones; 3, of the continental part of Europe by river-basins; 4, of the European isles; 5, of the European lakes; 6, of the seas of Europe, with its more considerable peninsulas and gulfs, and widths of the more important channels. The Annexes consist of tables employed in the necessary calculation (giving in square versts the superficies of trapezoidal areas of a degree in longitude and ten minutes latitude, and also of a degree in longitude and a degree in latitude, from 30° to 80° North; adopting Clarke's estimate of $\frac{1}{294.98}$ for polar flattening); the European superficies by zones of a degree of latitude, following the estimates of polar depression by Clarke, Bessel ($\frac{1}{299.15}$), and Walbeck ($\frac{1}{302.74}$), and giving the results in square kilometres, miles, and versts; the superficies by zones of the more considerable islands; and the superficies of the islands of the Swedish lakes.

A second volume is intended to enter into such detail as adaptability for agricultural purposes, the proportions of different cultures, &c.

General Strelbitsky enters minutely into his system as a whole, which is that of Prof. Savitch, and also discusses in each case the materials which have served as the basis of his calculations, and he is earnest in impressing the necessity of a knowledge of the methods and data (especially the titles and scales of the maps) employed, before accepting any future statistics of this nature.

His calculation of the entire European superficies is 10,010,486.2 square kilometres, = 181,800.82 square miles, = 8,796,407.3 square versts, thus exceeding Behm and Wagner's estimate by 2278.12 square miles, the difference being arrived at by including the Færøe islands, Iceland, Novaya Zemlya, the Northern Caucasus, and the Sea of Azof, and excluding the Canaries, Azores, Madeira, and the Trans-Ural parts of the governments of Perm, Orenburg, and Ufa. The "square mile" is, of course, the German one (= 21.26067 English

square miles), and the figures give 3,805,048·72182 English square miles as the total, which does not materially disturb received round numbers.

Perhaps the most useful detail is to be found in such parts of this work as refer to Russia; but the scheme of subdivision employed by General Strelbitsky enables him to give in an easily appreciable form much minute statistical information on other countries.

The maps show the States and zones of a degree of latitude (scale 1: 7,140,000), and river basins (scale 1: 10,374,000).

ASIA.

A Manual of the Geology of India.—Part III. Economic Geology, by V. Ball. Published by order of the Government of India. Calcutta (Office of the Geological Survey of India). London (Trübner): 1881, large 8vo., pp. xx. and 663, maps, illustrations. Price 5 rupees.

The first two parts, by Medlicott and Blanford, were published in 1879; the present one consists of a valuable collection of information concerning the distribution, history, and working of gems, metals, and economic mineral substances occurring in India, with indications of the relations of the districts in which they are found to what is known of the geology of the country. The maps are the General Index Map of India published by the Surveyor-General, corrected to August 1881, the Karnul, Kistna and Godavari (so-called Golconda) and Panna diamond mines, the Peninsular and Eastern Extra-peninsular Coal-fields, and the Wynaad Gold Region; and the illustrations mostly represent various engineering and other operations connected with the subject. Much topographical and bibliographical matter of interest is given throughout the work, of which it is perhaps impossible to overrate the economic importance.

Laurie, [Colonel] W. F. B.—Ashé Pyee, the Superior Country; or, the great attractions of Burma to British Enterprise and Commerce. London (W. H. Allen & Co.): 1882, cr. 8vo., pp. xv. and 283. Price 5s.

AFRICA.

Bisson, Léon de.—La Tripolitaine et la Tunisie. Avec les renseignements indispensables au Voyageur. Paris (Leroux): 1881 [1882], 12mo., pp. 147. (*Williams & Norgate*: price 2s.)

A slight sketch, preceded by a list of the chief works on the regions named, and concluding with useful hints to travellers on passage, money, hotels, &c., with a very short vocabulary.

Capello, Hermenegildo de Brito, and Ivens, Roberto.—De Benguela ás Terras de Iácca. Descrição de uma Viagem na Africa Central e Occidental, comprehendendo Narrações, Aventuras e Estudos importantes sobre as Cabaceiras dos Rios Cu-nene, Cu-bango, Lu-ando, Cu-anza e Cu-ango, e de grande parte do curso dos dois ultimos; alem da descoberta dos Rios Hamba, Cauali, Sussa, e Cu-gho, e larga noticia sobre as terras de Quiteca N'bungo, Sosso, Futa e Iácca, por H. Capello e R. Ivens, Officaes da Armada Real. Expedição organizada nos Annos de 1877-1880. Lisboa (Imprensa Nacional): 1881, 2 vols., 8vo., pp. xlv. and 379, xii. and 413, maps, portraits, illustrations.

The main features of the successful Portuguese expedition in Western Central Africa under Captain Capello and Lieutenant Ivens (who it will be remembered started with Major Serpa Pinto, parting with that traveller at Bibé) have already been laid before the Fellows of the Society in our 'Proceedings' for October 1880, p. 647, where an abstract is given of the Report read (in English) by Lieutenant Ivens before Section E at the meeting of the British Association at Swansea in that year. The present volume (which, though dated 1881, has only just come to hand, in insufficient time to attempt more than an account of its contents) gives partly in diary and partly in narrative form the details of the journey from Benguela southwards, through Dombé to Quilengues and Caconda, thence north-east, cutting the head-waters of the Cunene to Cangombe, crossing

the upper Quanza in Bihé and following the Quango through Quioco. From this point the expedition struck north and north-west, still following the Quango through Minungo and Quiembo to Cassange, then working to the west past Malange to Duque de Bragança on the Lucalla, from which settlement a nearly northern direction was followed until the Quango was again reached, its western bank being followed as far north as $6^{\circ} 32'$ S. lat., the territory of Quianvo or Muene Pute Cassongo, the chief of Iacca (or Jaca), which practically extends north to the Congo. Both on their journey to the interior and the return (by a more westerly route to Duque de Bragança, from which point the Quanza was reached by Ambaca and Pungo n'Dongo, and followed to the coast) various minor excursions were made in all directions, chiefly for the elucidation of the numerous and peculiar river-systems of the regions traversed.

Independently of the very considerable amount of novel geographical and topographical information afforded by the narrative, this work contains a great addition to our knowledge of Western Central Africa in the shape of two separate maps, one (scale 1 : 1,481,480) giving the entire routes of the explorers, from 4° to 16° S. lat. and from the west coast to 20° E. long., with profiles and magnetic observations referring to the chief positions; the other (scale 1 : 370,370) including from St. Paul de Loanda to Ambaca, $15^{\circ} 40'$ E. long., giving the lower course of the Quanza in detail. There are also various maps in the text, of Quilengues, Cassange, Malange, Duque de Bragança, Pungo n'Dongo, and N'Dumba (all 1 : 370,370); tables of geographical positions determined, and of heights of more important localities (with corrections of instrumental error); meteorological observations of an elaborate nature, preceded by a full discussion of instruments and methods employed, and illustrated by a table of curves; and determinations and summary of magnetic force in various positions, with a special illustrative chart.

Considerable attention was also paid by the travellers to zoological and ethnological matters: not only are various species of mammals, birds, amphibians, crustaceans and insects figured and referred to in the text, but there is a special Appendix, "Subsidios para a Fauna e Flora da Africa Central e Occidental," by Dr. Barbosa du Bocage and other authorities, extracted from the 'Jornal de Sciencias' of Lisbon, describing the zoological objects collected and observed, and a list of the plants by the Conde de Ficalho. A short summary of some African dialects is also given, with a rather extensive vocabulary of the N'Jenji, Garanganja, Quioco, Lunda, and Ca-Luiana languages.

The illustrations are not of the class to which readers are accustomed in works of this kind published in England, but are possibly on that account more likely to be faithful; at all events, they very sufficiently demonstrate the troubles and miseries of African travel.

Lacaze, H.—*Souvenirs de Madagascar. Voyage à Madagascar, Histoire, Population, Mœurs, Institutions.* Paris (Berger-Levrault): 1881, 8vo., pp. 166, map. (*Williams & Norgate*: price 3s. 6d.)

Dr. Lacaze's experiences were confined to the eastern central coast, including a visit to Antananarivo and an excursion towards the interior on the north of the Manangour river. In addition to the subjects referred to in the title, he pays considerable attention to the subject of French colonisation, any fresh attempts to which end as regards Madagascar are deprecated by him. The score of some Malagasy airs is given at the end.

AMERICA.

Slafter, [Rev.] Edmund F.—*History and Causes of the Incorrect Latitudes as recorded in the Journals of the Early Writers, Navigators, and Explorers, relating to the Atlantic Coast of North America, 1535–1740.* Boston (U.S.A.), privately printed: 1882, 8vo., pp. 20, illustrations.

This treatise, reprinted (in anticipation) from the 'New England Historical and Genealogical Register' for April 1882, discusses errors in the position of thirty-three North American localities, with the negative result that the

variations follow no uniform rule. Old methods of taking latitudes are briefly described, and the conclusion arrived at that early latitudes are generally trustworthy to within a single degree, though fractions of degrees anterior to the middle of the 18th century are not to be relied on, nor are the identifications of commentators by latitude alone to be properly cited as authority.

ARCTIC.

Gilder, W. H.—Schwatka's Search. Sledging in the Arctic in quest of the Franklin Records. London (Sampson Low, Marston, Searle, & Rivington): [no date] 8vo., pp. xvi. and 316, maps, illustrations. Price 12s. 6d.

The No. for November 1880 of our 'Proceedings' has already given an outline (with map) of the objects and results of Lieut. Schwatka's expedition to King William's Land, and also of its chief incidents. Ample details of the journey have also appeared in the *New York Herald* during 1880, but the volume under notice by Colonel Gilder, the second in command, will remain as the official and circumstantial account of this memorable search.

A considerable number of illustrations assist in the appreciation of Eskimo life and Arctic land travel; the maps by H. W. Klutschak, also one of the expedition, show (1) the overland route to and from King William's Land, scale 22 geographical miles to the inch, (2) the entire route, 70 miles to the inch, and (3) the lower portion of Back's or Great Fish river, 15 miles to the inch. In an appendix, there is a discussion of Inuit philology, with a glossary of all the words in general use in conversation between the natives and traders in Hudson's Bay and Cumberland Sound, sufficient for Arctic travellers, with the aid of a few signs.

Hovgaard, A.—Nordenskiöld's Voyage round Asia and Europe. A popular account of the north-east passage of the *Vega*, 1878-80. Translated from the Danish by H. L. Brækstad. London (Sampson Low, Marston, Searle, & Rivington): 1882, 8vo., pp. liv. and 293, maps, illustrations [no index]. Price 21s.

The publication of the Danish original was purposely postponed, so as not to clash with the fuller narrative by the chief of the expedition. Lieutenant Hovgaard's account of the now familiar Periplus condenses into the introduction the historical matter in which Baron Nordenskiöld's text is so rich, leaving the incidents of the voyage unbroken. There is, moreover, no attempt to deal with the scientific aspects, and as the better known portion of the journey referring to Japan, &c., is kept within a few pages, the Arctic experiences are kept prominently and continuously before the reader. The illustrations, though comparatively of rough execution, are entirely in keeping with the scope of the book.

GENERAL.

Coote, Walter.—Wanderings, South and East. London (Sampson Low, Marston, Searle, & Rivington): 1882, 8vo., pp. xvi. and 369, maps, illustrations. Price 21s.

Besides sketches of such well-known localities as the Australian colonies, Fiji, the Sandwich Islands (including notes and speculations on Mauna Loa and its volcanic action), the Chinese ports, Japan, and the South American coasts, this book contains a very interesting narrative referring to the New Hebrides, the Banks, Torres, Santa Cruz, Solomon, and Loyalty Islands, which were visited by the author in company with Bishop Selwyn under peculiar circumstances, the party being the first to land on some of the most dangerous islands since the punishment inflicted in September 1875 for the murder of Commodore Goodenough. Since their visit to the Florida group (lying at the upper end of Indispensable Strait in the Solomon Islands, which is but little known, and "is set down on the Admiralty Charts with the wildest inaccuracy," p. 180), it will be remembered that Lieutenant Bower, of H.M.S. *Sandfly*, and four seamen, were massacred on one of the small isles off Guadalcanar, on which Mr. Coote spent his only night on shore during the cruise. The question of the labour system in the South Pacific is entered upon at some length by the author,

who gives a list of murders and atrocities committed both by natives and whites.

During the cruise among the New Hebrides, Mr. Coote landed at Maewo (called "Aurora" on the chart), and describes an excursion into the interior, giving illustrations of a remarkably well constructed village which he visited. Terraces were found, identical as regards steps and basins with those of Rotomahana, though not formed of silica or white sinter. The shape of these tends to confirm the opinion of Mr. Abbay, recorded in the *Quarterly Journal of the Geological Society* (not of the "Royal Geographical Society," as quoted by the author in text and note) for 1878, that the water at the period of their formation must have been hot.

Cannibalism was found to be utterly unknown in the Banks' group, though so universal in other parts of Western Polynesia; and the author's observations on the natives generally, with the excellent illustrations given of various ornaments, weapons, &c., will be found of considerable interest; as also will his descriptions of the more striking physical conditions of the islands themselves. In referring to the natives of Santa Cruz, the note is made that the head-rests commonly used are not as in Japan and Egypt for the preservation of the hair, but on account of the number of ear-rings worn,—as many as thirty, some of considerable size, in one instance figured. An account is given of the tree-houses of the Solomon Islands, and a rough estimation of the different monetary objects in use.

A track chart on Mercator's projection shows the author's routes, and another on a larger scale gives the cruise in Western Polynesia from Norfolk Island to the Solomon group. The illustrations are excellent.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

THE WORLD.

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or 20·4 geographical miles to an inch. *Deutsche Geographische Blätter*, Band V. Tafel 7.

Petermann's 'Geographische Mittheilungen.'—Itinerar-Skizze einer Sommerreise von Nikko oder Hachiishi durch Iwashiro und Echigo und zurück durch Kotsuke & Shimotsuke. Nach eigenen Aufzeichnungen von E. Knipping 1879. Scale 1:250,000 or 3·4 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 5. Justus Perthes, Gotha. (*Dulau.*)

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Map of Ashantee and Gold Coast. Scale 1:633,600 or 8·6 geographical miles to an inch.

Survey of the Bussum Prah (to accompany detailed report). Lieutenant Reginald C. Hart, R.E.

Sketch Map of Road from Accra to Mansue. By T. R. Swinburne, Lt. R.M.A. 1881. Scale 1:126,720 or 1·7 geographical miles to an inch.

Sketch showing Routes from the Coast to Prahue, by Captain Arthur H. Pain, 1881. Scale 1:250,000 or 3·4 geographical miles to an inch.

Sketch of the British Frontier Station at Prahue. Scale 150 yards to an inch. Lieutenant R. C. Hart, 1881.

Sketch Plan of Prahue. Scale about 60 yards to an inch. Captain H. Jackson, R.A. 1881. Intelligence Branch, War Office, London.

Sarmiento, A. de Moraes.—Delta do Zambeze. Mappa coordenado por A. de Moraes Sarmiento, engenheiro militar de accôrdo com os dados e observações por elle colhidos durante as suas viagens de 1877–1880. *Jornal de Viagens*. Empresa Ferreira de Brito, Rua da Victoria, 166—Porto. Scale 1:460,000 or 6·2 geographical miles to an inch.

This map differs in many particulars from the Admiralty Chart "Mouth of the River Zambesi" (No. 2865), and the Portuguese Government Map of the Zambesi, compiled from the survey of João Monteiro Pinto da Fonseca Vaz, 2º Tenente de Armada, 1876; indeed the delta of the Zambesi is differently represented in each of these publications. In the survey of Fonseca Vaz, the mouth of the river West Luabo is not shown at all, and in the recent survey by Moraes Sarmiento, the same river, though shown, has an entirely different course from that laid down on the Admiralty chart. Again, the form given to the islands between the rivers Melambe and East Luabo differs in all these plans, and an island appears in the middle of the channel on Moraes Sarmiento's map that is not shown on either of the other two; while the channel at the northern end of Monguni Island is laid down as running N.E. and S.W. on one of the Portuguese plans, E.N.E. and S.S.W. on the other, and N.W. and S.E. on the Admiralty chart; indeed the shape of some of the islands in the delta, as given in this latest survey, is so unlike that assigned to them in the survey of Fonseca Vaz, that they bear but little resemblance to one another, and more nearly correspond with those laid down in the Admiralty chart; but even here there is a perceptible difference. North of this, the map contains several additions and corrections.

AMERICA.

Dominion Lands Office, Ottawa:—

Outline Map of the Dominion of Canada. Scale 1:12,500,000 or 171·2 geographical miles to an inch.

Map of part of the Province of Manitoba, showing Dominion Lands surveyed and Lands disposed of. Scale 1:390,000 or 5·2 geographical miles to an inch. (Preliminary edition.)

General Map of part of the North-West Territory and of Manitoba. Scale 1:1,385,000 or 18·9 geographical miles to an inch.

North-West Territory. Map showing Dominion Land Surveys between West boundary of Manitoba and Third principal meridian. From a map compiled by E. Deville, Inspector in charge of Current Surveys. Scale 1:420,000 or 5·8 geographical miles to an inch. Published by authority of the Rt. Hon. Sir John A. Macdonald, K.C.B., Minister of the Interior. Dominion Lands Office, Department of the Interior, Ottawa, 1881. Lindsay Russell, Surveyor-General.

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in January and February 1882:—

No.		Inches.	
1291	m	= 0·68	South America, west coast:—Pisco bay. Price 6d.
435	m	= 4·9	West Indies:—Ports and anchorages at eastern end of Cuba—Ports Niquero; Escondido or Hidden harbour; Cueva; Aguacate; Navas; Sigua; Boma; Mata; Bay; Baracoa and Miel bay; Maravi; Baitiqueri; Taco; Cayaguanique. Yumuri; Guanito bays. Limones river. Naguarage. Price 1s. 6d.
1244	m	= 5·24	Fiji islands:—Levuka harbour. Price 1s.
205	m	= 1·8	Japan:—Nanao harbour. Price 1s. 6d.
2119	m	= 12·0	Australia, east coast:—Newcastle harbour. Price 2s. 6d.
136	m	= 0·9	Bay of Bengal:—Hoogly river—Calcutta to Saugor point. Price 2s. 6d.
198	m	= 0·18	Italy, south coast:—Policastro to Cape Sta. Maria di Leuca, including the strait of Messina. (Plans, port Cotrone. Cape Rizzuto anchorage. Cotrone and Cape Colonne anchorages.) Price 2s. 6d.
452	m	= 0·08	Japan:—Yezo island, with the adjacent straits of Tsugar, La Pérouse, and Yezo. Price 2s. 6d.
2286	m	= 1·97	Sea of Marmara:—Approach to the Bosphorus from Stefano point to Prinkipo channel, including Princes islands. Price 2s.
97	m	= 3·0	Pacific ocean, Solomon islands:—Coughlan harbour. Barranago harbour. Price 6d.
224	m	= 0·27	Mediterranean:—Sea of Marmara. Price 4s.
55	m	= 6·0	New Britain:—Matava Bay. Port Weber. Kabakadai bay. Price 6d.
885	m	= 0·54	West Indies:—Guadeloupe, with the adjacent islands Saintes, Marie-Galante, Désirade. Price 2s.
2348	m	= 3·6	North America, west coast:—Sitka harbour and approaches. Price 1s. 6d.
338	m	= 1·5	New Caledonia:—Pouébo; Yengen ports. Ugue; Ba; Kuana; Buru; Nékété and Lavissière, bays. Price 1s. 6d.
2219	m	= 4·0	England, south coast:—Needles channel, with Christ-church bay. Price 2s. 6d.
2556	m	= 5·0	France, north coast:—Calais. Price 1s.
996	Plan added. Shimidsu harbour. (J. D. Potter, agent.)		

CHARTS CANCELLED.

No.		Cancelled by	No.
1291	Pisco bay	New plan, Pisco bay	1291
435	Taco	New sheet of plans, Ports and anchorages at eastern end of Cuba	435
436	Cayaguanique		
437	Navas and Maravi		
438	Baracoa		
439	Mata		
440	Baitiqueri		
441	Escondido or Hidden harbour ..		

No.		Cancelled by	No.
1244	Levuka harbour	New plan, Levuka harbour ..	1244
61	Plan of Nanao on this chart ..	New plan, Nanao harbour ..	205
2119	Newcastle harbour	New plan, Newcastle harbour ..	2119
136 a, b	Calcutta to Saugor point .. {	New plan, Calcutta to Saugor point	136
198	Cape Vaticano to Monopoli .. {	New chart, Policastro to Cape Sta. Maria di Leuca	198
2286	Princes islands	New plan, Approach to the Bosporus	2286
224	Sea of Marmara	New chart, Sea of Marmara ..	224
270	Simidsu bay	New plan, Shimidsu harbour on	996
2069	Suisun bay.		
2348	Sitka, or New Arkhangel {	New plan, Sitka harbour and approaches	2348
2219	Needles and North channels .. {	New plan, Needles channel, with Christchurch bay	2219
2556	Calais	New plan, Calais	2559

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 253a. Gulf of Aden:—Jibul Jarne to Sayara. No. 1183. England, west coast:—Kenfig river to Nash point. No. 101. Japan:—Anchorage in Awomori bay. No. 52. Ireland, east coast:—Wicklow roadstead. No. 386. Africa, west coast:—Princes, St. Thomas, and Anno Bom islands. No. 2760. Sumatra, west coast:—Acheen head to Tyingkokh bay. No. 2154. England, south coast:—Newhaven. No. 1674. Australia, east coast:—Brisbane river. No. 447. Australia, north coast:—Western approaches to Torres strait. No. 830. India: Bay of Bengal, east coast. No. 2300. Baltic sea:—Stiernö point to Umea lighthouse, and Sodra Björkö to Eugmo. No. 2301. Baltic Sea:—Umea light to Tome point, and Eugmo to Tauvö. No. 666. Africa, east coast:—Mombaza island and ports. No. 2820. Gulf of Mexico:—Pensacola bay. No. 2265. Central America, west coast:—Parida to gulf of Nicoya. No. 1577. North America, west coast:—Columbia river. No. 263. North America, east coast:—Cape St. Charles to Sandwich bay.

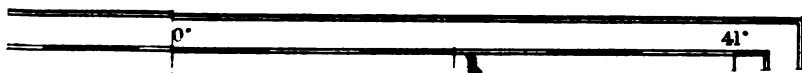
United States Hydrographic Office.—Chart No. 876. West Coast of Mexico from Chipecua Pt. to Ventosa Bay, showing the anchorages in Chipecua, Conejo, Salina Marques, Salina Cruz, and Ventosa Bays. From a Survey by Comdr. J. W. Philip, U.S.N., and the Officers of the U.S.S. *Tuscarora*. 1879. Published Nov. 1881, at the Hydrographic Office, Washington, D.C. J. C. P. de Krafft, Commodore U.S.N., Hydrographer to the Bureau of Navigation. Price 1s. 3d.

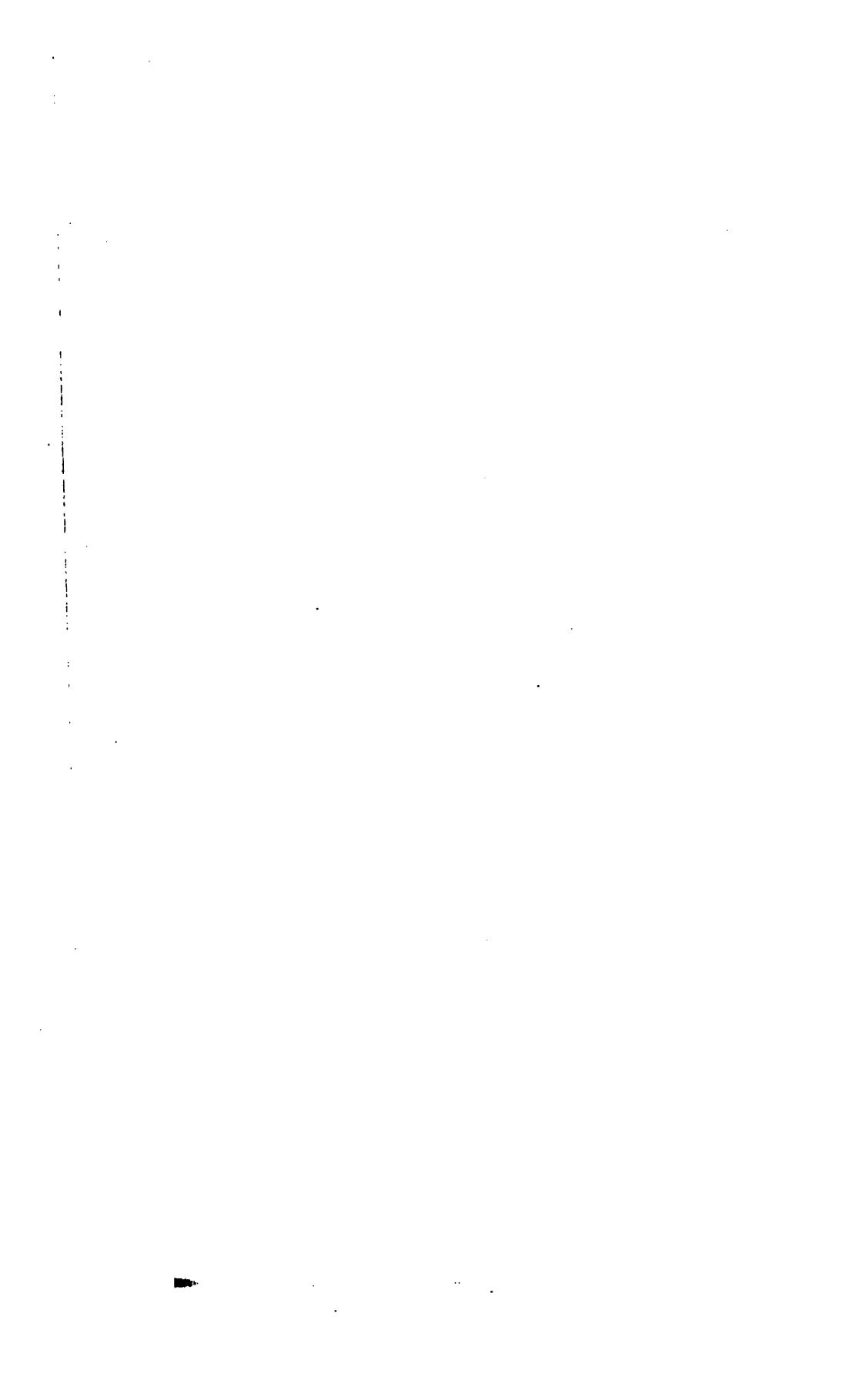
ATLASES.

Bevan, G. Phillips, F.S.S., &c.—The Statistical Atlas of England, Scotland, and Ireland, edited by G. Phillips Bevan, F.S.S., F.G.S., &c. To be completed in fifteen parts, each containing three coloured maps and letterpress. Part XIV. Political. W. & A. K. Johnston, Edinburgh and London. 1882. Price 7s. 6d. each part.

United States Geographical and Geological Survey.—Topographical and Geological Atlas of the Black Hills of Dakota, to accompany the Report of Henry Newton, E.M., Assistant Geologist, Department of the Interior. United States Geographical and Geological Survey of the Rocky Mountain Region. J. W. Powell in charge.

The following are the contents of this Atlas:—Sheet 1. Bird's-eye view of the Black Hills, to illustrate the geological structure. Sheet 2. Map of the Black Hills of Dakota, from Explorations made in 1875. Scale 1:250,000 or 3·4 geographical miles to an inch. Sheet 3. Geological Map of the Black Hills of Dakota, by Henry Newton, E.M. Scale 1:250,000 or 3·4 geographical miles to an inch.





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The River Irawadi and its Sources.

By Major J. E. SANDEMAN, Bengal Staff Corps.

(Read at the Evening Meeting, February 27th, 1882.)

Map, p. 328.

THE controversy as to the sources of this great river has been raging for very many years.

In 1879 an able Report on the river by Mr. R. Gordon, c.e., the Engineer of the Irawadi Embankments, was issued by the Government of British Burma. In it Mr. Gordon enters very fully into the hydrology and hydrography of the Irawadi, and after discussing the light thrown on the subject by past explorations and surveys, is forced to fall back on D'Anville's theory that the Irawadi receives the Sanpo, and is connected with no other river of Tibet, and that the Sanpo itself falls into no other river of India. He maintains there has been much assertion that the Sanpo and Brahmaputra are one river, but that no one has yet placed the claims of the Brahmaputra to be a continuation of the Sanpo on a scientific basis.

Since the publication of this Report by Mr. Gordon, I despatched, under directions from the Surveyor-General, and with the sanction of the Chief Commissioner of British Burma, a Burman explorer, after training him, to the branches of the Upper Irawadi, with instructions to follow the river up as far as possible. An account of this man's travels and adventures was published in a confidential form by the British Burma Government, and extracts were given in the Surveyor-General's Report to the Government of India for 1879-80.

As some new light has been thrown on the subject by this last survey, I propose to submit a few extracts from the explorer's journals, but before doing so I will give a brief *résumé* in the first place of former explorations of the Brahmaputra and its tributaries, and of the Irawadi, and secondly, of the views entertained by various geographers and by Mr. Gordon, as set forth in his Report on the Irawadi.

The Sanpo.—The existence of the great river of Tibet was known to us only from D'Anville's maps, compiled from the surveys of Jesuit missionaries and lamas trained by them, early in the eighteenth century, until Bogle crossed the river on his way to Lhasa in the end of the eighteenth century, and Turner and Manning a few years afterwards.

It was not till 1865 that the first explorer of the Indian Survey Department (trained by Captain Montgomerie) reached the Sanpo. He struck the river about longitude 84° , and went as far as Lhasa. In 1874 a very important geographical exploration was made by the Pundit Nain Singh, who, starting from Leh, mapped 1200 linear miles of previously unknown country. He was able to follow the river as far eastwards as a place called Chetang. In 1875 another explorer, L—, traced the river from Shigatzé to Chetang, already visited by Nain Singh. In 1878 Lieutenant Harman trained a Bhoota explorer, and sent him to Chetang, to survey the river downwards. This man's description of the Sanpo a short distance below Chetang enabled Lieutenant Harman to estimate its ordinary discharge as 15,000 cubic feet per second, and its maximum flood discharge as 250,000 cubic feet. At 120 miles below Chetang the explorer describes the river again as 250 paces wide, with slight current, and very deep.

He was able to follow it to a place called Gyala Sindong, 287 miles from Chetang, and only 100 miles from the furthest point of the Dihong (a branch of the Brahmaputra), as fixed from the Assam Valley. The intervening country is inhabited by wild tribes of savages called Abors.

Lieutenant Harman having estimated the discharge of the Sanpo, and having measured that of the Dihong and Subansiri (another branch of the Brahmaputra) is of opinion that the Dihong receives the Sanpo, its discharge being four times as great as that of the Subansiri. At this time also Captain Woodthorpe ascended a range of hills 9000 feet, which enabled him to acquire an accurate knowledge of the course of the Dihong, and to sketch the surrounding country. Lieutenant Harman surveyed the Subansiri, but owing to the strict orders of the Government was unable to go far enough to decide positively that the Subansiri does not receive the Sanpo. Captain Woodthorpe describes the Dihong as a fine river, divided in the plains into a network of channels, and gives it as his opinion that all the evidence is in favour of its being a continuation of the Sanpo, the discharge of the Subansiri being too small, and that if the Sanpo is made to pass to the eastward and fall into one of the Chinese rivers it restricts the drainage of the Dihong to an absurdly small area.

The Brahmakund, which forms the head-waters of the Brahmaputra, has been known since its first survey to be too small to receive the Sanpo. Wilcox gives its course as fixed for some distance in his map published in 1828.

The Irawadi.—The earliest attempt to reach the source of this river

was made by Lieutenant Wilcox in 1826. He crossed over from Assam, via the Noa Dihing river, and reached the Irawadi valley close to the source of the river, as he thought. He could see the snowy range forming the watershed. The following is an extract from his original journal.

"24th May 1826.—Visited the Irrawaddy. . . . The Irrawaddy is about 80 yards broad and fordable, the current rather strong, and rapids both above and below, the bank stony and shelving."

At Sadiya, before he started on this expedition, Wilcox heard that there was a "great eastern branch" of the Irawadi. Wilcox and his companion Burlton underwent many hardships on this journey, and some of their followers perished. From their description of the route and the quantity of leeches met with it may be safely inferred that the rainfall is very heavy in these hills.

From the Burma side, explorers have not ascended far up this river. Dr. Anderson in 1868 visited the first defile above Bhamó. Hannay, Bayfield, and Griffith went as far up the river as latitude 25°.

Mr. Strettel claimed to have gone as far north as latitude 26° in 1874, and to have seen the confluence of the two branches of the Irawadi. But that he was deceived by an island dividing the river into two channels, and that he turned back long before reaching this latitude has been found to be the case by the explorer whose travels I am about to relate.

Such is a very brief account of the principal explorations that had taken place up to 1879, when Mr. Gordon published his Report on the Irawadi River.

As I have said, Mr. Gordon maintains that the Sanpo and the Sanpo only flows into the Irawadi, and with reference to the latest maps published on the evidence of the explorations made from time to time, he says they only throw us into hopeless confusion. Mr. Gordon goes into the inquiry in great detail. I will state the main points of his reasoning. He says: "We have the curious anomaly of the river discharging two-thirds of its ordinary flood and much more than one-half of its extreme flood from about one-fourth of its drainage basin, if the theory of the Irawadi being confined exclusively to the Burmese valley be true."

Mr. Gordon, from such measurements as were made by Drs. Anderson, and Bayfield, Mr. Strettel, and others, and from their descriptions, estimates the high flood discharge of the river above Bhamó and above all its tributaries as 1,000,000 cubic feet per second, the drainage area being given by him as only 18,000 square miles. This is more than half its total discharge from one-fourth of its drainage basin, which he maintains is impossible, and therefore the Irawadi must be the outlet for some great river of Tibet. He estimates the discharges of the Salween and Mekhong rivers flowing parallel to the Irawadi, in the same

latitude, from the reports of various travellers who have crossed these rivers, and he puts them at 135,000 and 350,000 cubic feet per second, the proportions of the three rivers being as one, three, and nine. He argues that as the Mekhong and Salween have flowed for hundreds of miles, surely the Irawadi, with its discharge nine times greater than that of the Salween and three times as great as the discharge of the Mekhong, cannot be confined to the Burmese valley.

Mr. Gordon quotes Hannay and Griffith as to the imposing size of the Irawadi in latitude 25° , and the latter's expression of opinion "that the Irawadi is an outlet for some great river which drains an extensive tract of country," which opinion has been shared by all who have seen the size of the river above Bhamó. He quotes Mr. Strettel as having been to the spot where the river divides into two great branches, and concludes that the Irawadi at this point is a river of great magnitude, with a possible course of hundreds of miles. From the examination of the journals of MM. Huc and Gabet, Jesuit missionaries who visited Lhasa, and who crossed many of the Tibetan rivers, Mr. Gordon recognises them as the Salween and Mekhong and other well-known rivers, and therefore concludes that the Sanpo and that alone feeds the Irawadi.

Mr. Gordon's theories as to the rainfall in the Irawadi basin I will not enter into in this paper, except to say he appears to under-estimate what it must be in the hills enclosing the valley.

His Report on the Irawadi was the last addition to the series of discussions as to its sources when the explorer "Alaga" returned from his visit to the upper branches of the river, after an absence of six months. This Burman was chosen for his general intelligence and his aptitude in surveying. He was instructed in sketching ground and surveying with the compass, in pacing (2000 average paces in the mile), in the use of the sextant, and in hypsometrical observations, and in October 1879 he started with two companions as his attendants, with some money in the form of gold-leaf and the necessary surveying apparatus.

The starting-point of the explorers was Bhamó, a town about 800 miles from the sea, and which they reached by steamer. The latitude and longitude of this point have been assumed as $24^{\circ} 16' N.$
 $96^{\circ} 54' E.$, as observed by Captain Bowers.

From Bhamó the travellers went by boat as far as Kacho, once an important city. They were able to determine absolutely the latitude of this city, and of two other places *en route*, by star observations; these elements have been used to check the survey, which was made so far by noting distances by time and taking bearings to the bends of the river. Kacho was found to be in latitude $25^{\circ} 20'$, about 1000 feet above sea-level the temperature of the air in the shade on December 2nd at 9 A.M. being

65°, and at noon 71°. From here they proceeded by land, pacing distances, taking bearings, and sketching the surrounding country, as far as latitude 26° 8', where the route terminated, and where they were able to get double altitudes of the sun while on the meridian on two days, and thus determine their latitude, which checks the route survey, and is satisfactory; the longitude is derived from the traverse. *En route*, from a village called Pouksanpoon, they got a sight of the confluence of the two branches of the river, and their view extended some miles up the western branch. They thought it about 500 paces wide. They noticed this branch in flood, as they had previously observed the main stream to be, and their astonishment was very great when the next day they crossed the eastern branch to find it very low, flowing, where they crossed in a ferry-boat, in a channel 100 paces wide, and in some places divided into deep pools. Up its course it was coming down over boulders in rapids, the distance between the high banks being two or three hundred paces. They were able to fix the position of the river for about 60 miles up its course; and they have proved that "the great eastern branch" of the Irawadi of which Wilcox had heard is really smaller than the western branch.

Their record as having crossed the "little river" on their way up is dated 24th January, 1880. Again, on the 18th February, they recrossed it on their way back, and found it still lower. On the 20th they came in sight of the main stream, and saw that the flood was higher than on the former occasion. This, I think, clearly indicates the nature of the two sources; besides, the explorers were informed that the flood was due to the melting of the snow in the hills at the source of the western branch, and the ferryman where they crossed the "little river" told them that the eastern branch did not rise at that season. The explorers describe the breadth of the Irawadi at Hnote-choyone, about latitude 24° 50', as over a mile, at Ayengdama as a mile, the eastern bank being 18 feet above the water.

Maingna was found to be the frontier town of the Burmese, beyond which no tribute is paid to Burma.

The "Kansa" Kachins stretch as far north as lat. 26°, to Marapoon; they are a savage race, and each village is under its own *swaba*, or chief, who is supreme. Beyond the Kansas are the Khanloungh Kachins; these are described as a degree less savage, and their *swabas* appear to be under a *King-swaba*, called Marangyee; he is more mighty than any other *swaba*, and has many adherents. To the eastward are the Maroos, another tribe of Kachins, and they are said to stretch as far north as the watershed of the river, beyond being a people wearing white clothes and speaking an unknown tongue, probably the people of Tibet. The Kachins are divided into many sub-tribes, the names of which are given in the explorer's journal. The Shans were heard to talk of the eastern branch of the Irawadi as the Myitgne (little river) and as the Engmyit, or lake

river; the western branch they style Myitgyee (great river). The Kachins called the two branches Mehka and Maleeka, which also are said to mean little and big. At Maingna the explorers were told that Mr. Strettel some years previously had returned from a deserted village, Shantarokywa, two or three miles further up the river, where there is an island. Mr. Strettel himself says he returned to Maingna in fifteen minutes from the place he reached.

I will now give a few extracts from the explorer's journal, as nearly as possible in his own words, regarding the country and people.

Between Bhamó and Maingna, the Burmese frontier town, are Burmese Shans, Poons, Kadoos, Kantees, and Shan Tarokes, with Kachin homesteads scattered among them. The Poons live by cutting bamboos and cultivating the hillsides. There are no tillers of rice-fields. They speak a dialect of their own. They dress as Shans. The Burmese authorities take from them what revenue they please, and the Kachins levy blackmail from them when they wish to sacrifice to the náts or evil spirits. They are Buddhists; they build monasteries, and reverence the sacred clergy and images. The Kadoos are also Buddhists; they are cultivators of rice and gardens of tobacco, cucumbers, &c., and live by trade. They import salt, cloth, betel-boxes, &c. Some men earn a living by washing for gold. The Shan Tarokes "grow poppies and make opium." They have two sets of clergy; the one conduct themselves like the Burmese *phoongyees*; the other, calling themselves the *pweh* clergy, eat their rice morning and evening, drink spirits, and smoke opium daily.

Ayengdama, Kacho, Waingmawmyo, and other places are described as having been flourishing cities once. Now they are mere villages enclosed in palisades. Every night at eight o'clock the gates are shut and armed patrols keep watch to prevent surprise from the Kachins. There are still the remains of walls and ditches, and extensive rice clearings lie fallow. There was at one time a great trade with China, but it has almost entirely fallen off, owing to the depredations of the Kachins. Were trade resumed, Ayengdama, the explorer thinks, would again become a great city. By the Namtabet route there is still some trade in cloths and iron cooking pots. Fine forests of teak and other valuable timber were seen; above Maingna the hills are described as covered with *Ficus elastica*. The land is fertile; the poppy, oil seeds, Indian corn, yams, cotton, and a little tea are grown. Lead ore is found at the Namtabet creek below Kacho, and is smelted on the spot, the metal being sent to China and Burma. Gold is to be had by washing the sand wherever a sandbank appears. Gold ore is said to exist at one place in the Khanloung country. This spot is marked on the map. Beyond Maingna, the only inhabitants are Kachins; their hills are said to be fertile and the soil moist, water being abundant to the tops of the hills, and the slopes being terraced for rice. The

population is very dense, so much so that they are not able to grow enough rice for themselves, and are obliged to supplement their food with yams, arums, &c. Cattle, pigs, and poultry appear plentiful. The Kachins drink a fermented liquor from rice and smoke opium daily, just as, the explorer says, the Chinese drink tea. They have no bowls or plates, but eat their rice from leaves and drink from hollow bamboos. The Kachins also "grow poppies and make opium." The explorer's evidence of the cultivation of the poppy by the Kachins and Shan Tarokes is to be noted, as bearing on the subject of the present agitation against the opium traffic. It is clear that the extensive cultivation of the poppy, as reported to exist in the neighbouring Chinese provinces, Szechuen and Yunnan, extends to the valley of the Irawadi, whence it can be smuggled into British Burma. The marriage customs of the Kachins are a little peculiar. When a man and woman set up house, the man has to give to the parents of the woman cattle, pigs, gongs, muskets, *das*, slaves, clothes (*pasos*), spears, and money; and for his wife's use he has to give coral beads, *tameings*, jackets, broadcloths, &c., according to his circumstances. After the gifts the woman is brought to the man's house, and the man has to feast the bringers of the woman with rice and curry and spirits and liquors. To the elders also he has to give blue waistcloths, turbans, *dahs* or spears according to their degree. The man then shows the woman all the work to be done in the house, and bids her do the work. After having lived together for a long period, if the man dies, the woman cannot marry any one; but the elder or young brother has to set up house with her. If there be no brother the deceased man's father (the woman's father-in-law) takes possession of her, and makes her his wife. If an elder brother dies, the younger brother takes over his wife. If the father dies, the son takes over his father's wives, and makes them his own, except his own mother. If a wife dies, the husband goes to her parents and asks for another wife, and they have to give him her elder or younger sister—a woman who is unmarried. If there be no sister to give, they have to give a female relative. Husbands and wives must not be at enmity with each other: divorce is unknown as a custom. However bad husband or wife may be they cannot separate, unless, in the case of the husband, he gives double the amount of what he originally gave her, and in the case of the wife, unless she gives quadruple the amount she originally received. If the man sets aside his wife and takes another, the head wife has the right to take possession of all the property of the younger wife, as well as to sell her. The young unmarried men and women, so long as they are not brothers and sisters, act as they please inside the apartments of the house.

The Kachins wear waist-cloths and red or white turbans. They get jackets from the Shans by exchanging for them sesamum, indiarubber, or cotton; they cannot weave jackets. Some wear hair-knots, some cut

their hair as low as their ears. One Kachin *swaba*, Marekka, of Katewaypoon, where we stayed to cook and to eat, had two switches of hair of the thickness of one's thumb, and four cubits long, each of which encircled his head three times, that is six encirclings of hair like a turban. He had also the usual top-knot. With this *swaba* we spoke amicably, giving him such presents as we had. The women wear waistcloths dyed black and blue, five hands long and not very wide. The jackets are close-fitting, and over them they have a looser one set with cowries. This is probably full dress. Round their waists they have perforated cowries on three or four hoops of rattan. From their knees down to their calves they wear hoops of rattan. Some women, the wives of the principal men, tattoo their legs from the knee to the ankle. They wear also red and white beads. The men daily smoke opium, and all, old and young, drink liquor daily. They do not understand trade, but when in want of salt or dried fish, they barter with the Shans with oilseed, cotton, rubber, &c.

If a man is fairly well to do he has three or four slaves. The chief men have from ten to fifty male and female slaves. The masters and slaves work and eat together. When a Kachin dies he has a splendid funeral, and after cattle, pigs, and poultry have been killed, feasting and drinking goes on. Young men and women surround the dead body and jump and dance day and night. The body is interred in some sacred spot, a trench being dug round it and a mound heaped up in the centre, over this a roof is erected on posts. The body is placed in a coffin and paddy, flasks of spirits, *das*, and wallets are interred with it, skulls of cattle and pigs being hung up for people to see. Their only belief seems to be in evil spirits, to whom is attributed every illness, and on such occurring also fermented liquors are drunk and poultry and pigs sacrificed. A Kachin village is always named after the *poon* or hill on which it is situated.

During the summer bands of Kachins attack Shan or Kachin villages which they can overpower. The men are cut down, and the women and children exchanged for opium, silver, or cattle, or made slaves. If two men quarrel they fight until one is killed; the conqueror seizes the wives and children of his victim and sells them. When a *swaba*, or chief, assembles a band of men for a plundering expedition, he does not pay them in coin, but gives them a certain weight of opium, and thus causes large numbers to follow him to attack and to destroy. Coin does not appear to be current, but opium is used instead; for this reason the explorers exchanged their money at Kacho for two lumps of opium.

The Kachins are not migratory, but are in the habit of dwelling in one place. They are filthy in their dress, indecent in their habits, and act like the brutes.

One Kachin named Sagoonoung showed the explorer a snake's head with two horns of the thickness of the axle of a spinning wheel, and

about one inch long. The Mogoung Maingkoung *swaba* has a flat stone, black, and something like the palm of a man's hand, from which an oily substance oozes; if the stone is put on one side it turns over on the other, and is supposed to have life.

No Shans or Burmese go among these Kachins, and therefore "Alaga" and his companion "Amite Mashee" found there was no use in their attempting to penetrate further, and they returned after an absence of six months.

Having to turn back before reaching the sources of the river, they did the next best thing, which was to gather much important information from the people of the country regarding them. They heard at Kacho that the sources of the river were in the Kantee country, twenty-three marches distant. On reaching Mogoungpoon they heard the sources were distant eight or ten marches. This places them where Wilcox puts them, in "Khamti," about lat. 28°, and is a confirmation of his survey.

The following information they gathered about the eastern branch. They heard that it split up into two principal affluents, one being six days' journey northwards, and rising in the same snows as the western branch, and only one day's journey across from river to river; and the other rising in a lake five or six days' journey eastwards in Chinese territory. At Mogoung-poon Maingkoung, a *swaba* said that six days' journey from that place the river ceased. He pointed in the direction. He said he had been there. Another *swaba* said he lived formerly at Sakeepoon, and had been up the northern affluent to where it ended, five or six days' journey from his former home.

A man, K—, of Kacho, who accompanied the explorer from that place, said that he was one of 100 men enlisted by the Chinese to fight against the Panthays; that he had been to a lake called "Noungsa," so large that he could not see across it. He saw a river flowing out of it to the west, which he was sure was the Irawadi. This information was confirmed by a man of Zeegzoon, who also had been there, but whose name the explorer had forgotten.

A day's journey has been considered ten miles, as that is the distance the Kachins are said to travel in one day.

The explorer met with difficulties and dangers, especially in carrying out his surveying operations, but owing to political considerations I am not able to go into details as to these, and as to the reasons why he turned back before reaching the sources of the river; some interesting matter is thus omitted.

Conclusion.—The account of this explorer's travels ends the series of attempts that have been made to discover the sources of the Irawadi and the outlet for the Sampo up to the present time. Now let us see what main facts we have to go upon in forming an opinion as to the courses of these rivers.

1. The Sanpo has been traced to within 100 miles of the furthest known point of the Dihong. Two engineers have expressed it as their opinion that the Dihong is capable of and probably does receive the Sanpo, after estimating the discharge of the latter from approximate data given by an explorer, and after measuring the discharge of the Dihong.

2. Lieutenant Wilcox in 1826 went close to the western source of the Irawadi and placed it about lat. 28° . He found the river only 80 yards broad, whereas Lieutenant Harman's explorer describes the Sanpo below Chetang as 250 paces wide.

3. The Burman explorer Alaga's hearsay evidence regarding the locale of the Irawadi's sources, confirms Lieutenant Wilcox's exploration.

4. This explorer saw both branches of the river, and found the eastern branch, the one in which some geographers have put their hope, the smaller of the two, and also very low when the main river was in flood.

5. From the hearsay evidence of two men who stated they had been to the sources of both affluents of the eastern branch, he was enabled to fix their positions within six or eight days' journey of where he was in lat. $26^{\circ} 8'$. A map of the country above the parallel of $26^{\circ} 30'$, if compiled from the above hearsay evidence of this explorer, agrees very well with the map published by General Walker in his report for 1879-80, entitled a Map of Some Sources of the Irawadi River. The country below the parallel of $26^{\circ} 30'$ is taken from the map compiled by me from the journals of the explorer Alaga, and the country north of the parallel of 27° is taken from Wilcox's map, published in 1828, of his own surveys. A portion of a smaller scale map by Father Desgodins, to illustrate a paper on the eastern frontier of Tibet, is also given for comparison. General Walker considers the information from these three independent sources fairly accordant, although he says greater exactness is still necessary for correct geography.

6. If the Sanpo is made to fall into the Irawadi, it must cut through the Brahmakund, as fixed by Lieutenant Wilcox and given in his map; there is no room for it between the Salween and Brahmakund.

From the above evidence one would doubtless say that the Sanpo is continued in the Dihong, and that the Irawadi rises about 28° N. lat. But on the other hand, and against the evidence of these explorations, and in support of the theory that a large river feeds the Irawadi, we have the following facts:—

1. D'Anville's authority, on which Mr. Gordon lays such stress, that the Irawadi is the outlet of the Sanpo, and no doubt D'Anville was a great geographer, but his opinion was expressed long before these explorations were made.

2. The explorer Alaga describes the Irawadi as a mile wide north of Ayengdama, with high banks. All Europeans who have seen the

river above its main tributaries have expressed their opinion that it must be the outlet of some large river, and that its course must have continued for hundreds of miles, and that the drainage of the Burmese valley alone does not suffice for its large volume. Dr. Griffith says "the great branch from which the Irawadi derives its vast supplies of water still remains to be discovered, and will probably be found in the *Soomeekha*," meaning the *Mekha* or eastern branch of the explorer Alaga. Wilcox had also heard of this great eastern branch. But we have seen from Alaga's account that this is comparatively a small river, and afterwards splits up into two affluents.

3. We have Mr. R. Gordon's exhaustive and able argument, the text of which is: What is there to account for an estimated discharge of 1,000,000 cubic feet per second above all the tributaries of the river? In claiming the Sanpo as the feeder, he argues that the two engineer officers must have under-estimated the discharge of the Sanpo at Gyala Sindong, and that the Dihong must be too small to receive it. As to Wilcox's visit in 1826 to the Irawadi, Mr. Gordon disposes of that by saying that he probably mistook some mountain stream for the Irawadi. I think this is rather unfair to Wilcox.

It is possible that Mr. Gordon over-estimates the discharge of the river in lat. 25° , as the data for arriving at the cross section and speed and flood rise of the river are rather imperfect; there also is no telling what the rainfall may not be in the hills from which issue the various upper affluents. The journals of Alaga and Lieutenant Wilcox indicate a large rainfall on both sides of the valley. Weighing the evidence on both sides, notwithstanding Mr. Gordon's strong arguments it still seems the Irawadi cannot come from much further north than latitude 28° , and that it must be confined to the Burmese valley.

To account for the phenomenon of the river having such an enormous discharge at the lowest estimate at a point comparatively so close to its sources, and as another opinion against Mr. Gordon's theory, I think it will be interesting if I read what Mr. Trelawny Saunders, who has made a study of the Himalayan mountain systems, and who is quoted at page 205 of Colonel Laurie's new book on Burma, says; it is as follows:—

"In cutting a passage for the Irawadi, so as to connect it with the Sanpu without intruding on the course of the Nu or Salween, Mr. Gordon does not hesitate to destroy Wilcox's delineation of the rivers which descend to the Brahmakund from the east, and are said to water the Chinese and Lama stations bearing the names of Chusi and Rooema. It may be as well to note that the missionary Desgodins adopts Wilcox's hydrography in the maps which he has published. But Mr. Gordon places Chusi on the Salween, and Rooema on the water-parting chain which he has imagined between the Sanpu-Irawadi and the Nu-Salween in that part. It would be interesting to know whether Mr. Gordon has

any authority for thus dealing with those places, which, being the reported seats of the Lama and Chinese authorities respectively, must be regarded as of considerable importance in any attempts to penetrate this sealed territory It is no doubt difficult to account for the vast volume of water which finds its exit by the Irawadi if its sources are confined to the southward of the 28th parallel of north latitude. Hence the inducement to connect the Irawadi with the Sanpu, which, even according to Mr. Gordon, is the only one of the Tibetan rivers which can be supposed to fall into it. But has it been sufficiently considered that, although the Irawadi basin, confined to the south of 28° north latitude on the north, and by the course of the Salween on the east, is extremely small for the production of such a body of water, that it is a region of perpetual snow, probably falling in excessive abundance, so as to supply a great stream even in the winter months, and one vastly greater when the intense heat of a tropical sun is employed in vain to deprive all the snow of its quality of perpetuity. It is impossible to turn aside from reflection upon this hitherto inscrutable problem without expressing a hope that its solution will engage the perseverance and energies of the Indian Government, and that the cordial aid of the Government of Pekin will also be enlisted."

In conclusion, I have endeavoured as briefly as possible to give a *résumé* of the information which has been collected up to the present time regarding the sources of the Irawadi, not an insignificant contribution to which has been the discovery of Alaga that there is no "great eastern branch" of the river. When that information is so imperfect and contradictory, it seems impossible to come to any satisfactory conclusions. But it is to be hoped that the ignorance on this subject will not be prolonged much longer. It is not only of great interest but of some importance that the correct geography of those rivers watering our frontier provinces should be known, and the cause ascertained of the enormous rise—about 40 feet—of the Irawadi in the monsoon, causing such floods that it has been necessary to construct vast embankments in British territory to try to control the course of the river, and to reclaim extensive areas thus thrown out of cultivation. Perhaps if the matter were taken up by the Royal Geographical Society, and representations made by it to the Government of India, efforts would be continued to solve this problem. What has already been done in this direction is due to the interest taken in the subject by the Surveyor-General and the last two Chief Commissioners of Burma. Our unsatisfactory relations with Upper Burma retard explorations and surveys in that direction.

After the return of the explorer Alaga, I trained another explorer, a Mussulman, and, with the sanction of the Chief Commissioner British Burma, despatched him to Sadiya to follow up the Irawadi by Wilcox's route, but after months of absence he returned last July, having failed in the attempt.

On the conclusion of the paper—

Colonel YULE said that the little he had to say upon the subject must be a repetition of what he had stated on three or four previous occasions; but while if a person told the same story over and over again every one criticised and noticed it, nothing was so safe as to quote one's own books, because nobody ever recognised *that*. The question had not made much advance during the past thirty years. They were greatly indebted to Major Sandeman for the public spirit which induced him to train and despatch native explorers. The doubt respecting the supposed connection of the great Tibetan river with the great Burmese river arose from the impression which the Irawadi made upon European travellers, viz. that it was too great a mass of water to have come from no higher latitude than that which Captain Wilcox indicated. But there was another side to the question. If, casting aside all the data furnished by Captain Wilcox and Major Sandeman's explorer, it was assumed that the Sanpo flowed into the Irawadi, a new puzzle was started, namely, whence came the great mass of water that filled the Brahmaputra. Thus a violent assumption would be made simply to produce a new paradox. Mr. Gordon, who had written a very large book upon the Irawadi, laid great stress upon the authority of D'Anville, but this was a question in which authority meant nothing. D'Anville was indeed the first who put together the surveys which the Jesuits sent from China and made the Sanpo known in Europe; but he knew nothing about the real discharge and bulk of the Sanpo, and very little about the real discharge and bulk of the Irawadi. He merely found a great river at one place, another at another place, and like the gentleman in Pickwick he combined the information. That was a thing that geographers had been in the habit of doing from the days of Ptolemy, and they had made many blunders thereby. The theory that the Sanpo flowed into the Irawadi was taken up with great perseverance fifty years ago by the celebrated Julius Klaproth who forced latitudes and longitudes, quoted Chinese documents, and wrote many papers to prove it. Though Klaproth was an authority that had been very much damaged by something on which Sir Henry Rawlinson enlightened the Society ten or twelve years ago, he (Colonel Yule) believed that the Chinese documents which Klaproth quoted were more or less genuine, because they were found in the great collection of French memoirs about the Chinese, published before Klaproth's time. His own view was that Chinese geographers, like some other geographers, had time to speculate and raise questions, and the same points occurred to them as had occurred to European geographers. They had maps of Tibet, and found a number of large rivers coming from the north and disappearing in savage countries: they also found large rivers in Burma coming out of wild regions in the north, and they combined the information. The same side of the question had been taken up recently by an eminent Frenchman, M. Elisée Réclus, who had recently published a new volume of his great Geography which treated of Eastern Asia. He treated rather contemptuously what might be called the orthodox doctrine that the Sanpo was the same as the Brahmaputra. His statement was: "It is probable that the gratuitous hypotheses of Rennell and Wilcox and other geographers have done nothing but raise a confusion on the subject of the basins of the Brahmaputra and the Irawadi." It was rather a rash judgment to say that the suggestion that the Sanpo flowed into the Brahmaputra had done nothing but raise a confusion. The particular doctrine of Klaproth was that the Sanpo entered the Irawadi by the stream which flows into it at Bhamó. We have long known that the Bhamó stream is one of no importance; * but that town had not then been visited by

* M. Réclus accuses Wilcox of saying that the Irawadi at Bhamó is a *ruisselet*. This is sadly inaccurate. The stream that Wilcox speaks of in such terms is that which enters the Irawadi on the north side of Bhamó.

any European, and some most beautiful French and German maps were published, representing the Sanpo entering the Irawadi with a fine wide head of water at Bhamé. Those maps had had a curious effect upon the history of this question. The French Missionary priests who went out to Tibet and made settlements on the frontier near the Salween, and who were therefore regarded as authorities because it was said they were "on the spot," had carried out with them the maps representing the Sanpo as flowing into the Irawadi, and when they sent home information, they merely retailed what they had had in their minds for twenty years, derived from the erroneous maps founded on Klaproth's theory. Mr. Gordon and M. Réclus said that the theory of the junction of the Sanpo with the Brahmaputra was invented by Major Rennell. Major Rennell was in fact the first intelligent observer who ever saw the Brahmaputra. When he ascended it before 1770, about as far as Goalpara, he was at once struck by the enormous size of the river, far beyond anything he had been led to expect, and he sketched out on his map a probable junction with the Sanpo, which was wonderfully like what was now known as the Dihong. But Rennell was not by any means the first to suggest this. Instead of being a new and heterodox belief, it was the old belief of the natives on both sides of the mountains. It was distinctly set forth in the fourteenth volume of the French '*Mémoires concernant les Chinois*' in a Chinese document on Tibetan geography published in 1696, that the great Tibetan river ran down into India. In a manuscript by Padre Desideri belonging to the Hakluyt Society, which he hoped would be published before long, the author, who left Lhasa in 1721, distinctly stated that the river flowed down into India and joined the Ganges. Another missionary, Horace della Penna, a Capuchin who about 1730 wrote a very interesting book about Tibet, which was published by Klaproth, also stated that the great river flowed down by Rangamat (near Goalpara) into the Ganges, and so into the Bay of Bengal. The same thing was also stated by P. Antonio Giorgi in a famous book called the *Alphabetum Tibetanum*. His statement, however, was only derived from others. When Nain Singh was at Lhasa in 1874 he was told by the Nepaulese and Kashmiri residents there that the great river of Tibet was the Brahmaputra, and all the Tibetans whom he asked said that it flowed down into India. On the Assam side, again, according to Wilcox, Mr. David Scott, the first British Commissioner of Assam after the Burmese war, met with Lhasa merchants in Assam who told him that the river there was their own river, that it passed Lhasa, penetrated the frontier mountains, and there received an additional supply from the Brahmakund. That was before Upper Assam had been surveyed, and when nothing was known about the Brahmakund except by report. Wilcox was not a man who ought to be treated as Mr. Gordon had treated him. He was one of the most intelligent and competent of writers on geographical subjects, as well as a great traveller. No one could read his papers in the '*Asiatic Researches*' without being struck by his acuteness and accomplishments. He stated also that he had heard from a Mishmi chief that the Dihong was the great river of Lhasa. It was therefore very far from being a whimsical theory of Major Rennell or anybody else; it was the orthodox doctrine, and positive demonstration was required to change it for another. Mr. Gordon had dealt a great deal in his book with millions of cubic feet per second, &c.; but those were the extreme flood discharges, and were perfectly valueless so far as settling the question was concerned. The only discharge of any value in comparing rivers of this kind was the mean low-level discharge. He remembered years ago standing on the Kasia hills near Cherra-punji, and looking across 80 miles to the Tipurah hills beyond. The whole was a mass of water. He did not think it could be measured; at any rate, millions of cubic feet per second would perhaps not represent the discharge; and yet the Súrma was not a very important river. But

then the rainfall at the spot where he stood was from 600 to 800 inches per annum! That showed that it was quite vain to talk about flood discharges, and it was also vain to assume quantities of rain, in a country about which there were no data. It was very possible that the rainfall near the sources of the Irawadi was very excessive, the position being like the end of a great funnel. Colonel Prejevalsky had ascertained a fact which was entirely new to geographers and physical philosophers. Where the Hoang-ho left the mountains forming the north-west boundary of China, he came suddenly from the dry steppes of the north upon a mountain country of the most extraordinary moisture; and further south Abbé David, who went up the Yang-tsze-kiang into the eastern part of Szechuen, came upon a continuation of the same country. He stated that if a man fired a gun he brought down a heavy shower of rain! The supposition of excessive rainfall north of Kampti was very probable, from what was known of the Kasia hills, where the rain was most excessive. He thought it very possible that the key to the extraordinary discharge of the Irawadi might be that there was an extraordinary rainfall among the hills. But the question might be considered from another point of view. The Mogoung river-mouth was the highest point on the Irawadi that had been reached by any European travellers from Burma. Colonel Hannay, Dr. Bayfield, and others, were all obliged to leave the Irawadi there, and to go towards the Assam hills. They were all struck by its magnitude at that point, as was also Dr. Griffith, who was perhaps the best observer among them. But many years ago he (Colonel Yule) calculated the basin of the Irawadi above that point, and he found it to be about the same as that of the Rhine at Cologne. And it was easy to imagine what a tremendous flood the Rhine would be if it were fed by only one half the rainfall of the Kasia hills!

General Sir HENRY THUILLIER said this was a most interesting problem, which had been often discussed, and he had no hesitation whatever in stating that his views accorded with those of Colonel Yule. He believed that all English geographers, in opposition to the continental geographers D'Anville and Klaproth, were decidedly of one opinion with regard to the outfall of the great Sanpo. On the map of India which had just been sent to England, which had been many years in preparation, and on which he had himself been engaged for several years, the course of the Yaro, or Sanpo east of Lhasa, was still dotted, as it ought to be by rigorous geographers. As Colonel Yule had stated, Captain Wilcox was a most admirable geographer; and, in addition to that, he was an astronomer. He had the conduct of the great observatory at Lucknow; but, unfortunately, the results of his life labours were destroyed during the mutiny. Any person who would study his map and look at the head of the Assam valley and the configuration of the Himalayas there, and the great altitudes which had been measured, would think at once that it was an impossibility that the Sanpo could pass through the great chain of mountains dividing Tibet and Hindustan from Burma. Mr. Gordon considered it an impossibility that it could go anywhere except into the Irawadi, because the Brahmaputra could not go through. Therefore the reasons that Mr. Gordon gave for his theory were exactly those that he (Sir Henry Thuillier) should give for the opposite theory. He should like to say one or two words on the subject as to why the Survey of India had not, up to the present moment, been able to solve such a problem. It was a most remarkable thing that if a circle was drawn around the head of the Assam valley, there was scarcely any part of the whole world less known than the tract round the triple boundaries of Tibet, Burma, and Hindustan, though it was at the very doors of the British Empire. The reason was this. For many years every exertion was made to obtain the sanction of Government for explorers to go there; but the answer always was, "No; if we cannot avenge

or defend, we cannot give any sanction to any person going there." A former endeavour to penetrate there was by the Frenchman, M. Kreik, who went there, and was immediately murdered. Mr. T. T. Cooper had also more recently attempted to penetrate that way, so as to complete his grand circuit, made from the China side, and in which he was repulsed. The difficulties were political. Physical difficulties could be got over. If they could not overcome them, they could overturn them; but the inhabitants of the mountains around Sadiya, at the head of the Assam valley, were of such a nature that it was next to impossible for any European to get there, whilst the jealousy of Tibet and China rendered all exploration in those countries a most difficult operation. His successor, the present Surveyor-General of India, General Walker, had sent pundits and natives of India about in every direction beyond our frontiers. As Colonel Yule had mentioned, the little Ghoorka Nain Singh, who went to Lhassa, was deputed to try and find out the connection of this river. At Lhassa he was severely treated, and he escaped only by leaving his baggage there, stating that he would go to a fair on the road to make a pilgrimage and return. He fled; but, unfortunately, instead of making his way more towards Sadiya to the eastward, he went down straight south and came out at Goalpara. There was another pundit who, it was to be hoped, would accomplish the journey very soon; but until some native explorer went through the country, or wood was floated down from Lhassa to the Dihong, it could not be actually proved whether the Sanpo flowed into the Brahmaputra or whether, according to Klaproth and the German geographers, it flowed into the Irawadi. One of the difficulties connected with the solution of the question was the language of Tibet. Sanpo simply meant "big river"; and therefore there could be no certainty at all about what big river was meant. Colonel Godwin-Austin, a first-rate surveyor and geologist, thought he might be able to trace it up the Subansiri, which ran from the middle of the Assam valley; but, owing to the orders of the Government, he was recalled when employed in the Duffla campaign. Still, it was sufficiently proved that there was not enough water there. With regard to the theory founded on the volume of water in the Irawadi, he held it of little value. It could be proved at any time that in the Brahmaputra or Dihong the volume was equal to that of the Irawadi. He had great hopes that the explorer who had been recently sent out from the Survey of India would pass down the Sanpo and prove incontestably that it formed a junction with the Dihong of Assam, which flows into the Brahmaputra. Major Sandeman was one of those experienced officers of the Survey of India who had done excellent service in various parts of that country and had written an interesting and exhaustive paper on the subject of the valley of the Irawadi, near which his labours were carried on. In his opinion, the valley of Burma and the head of the Irawadi valley had not been examined half so much as the head of the other valley; and therefore he did not think that any satisfactory solution of the problem had been afforded. Still, he was quite certain that the Society would give their approval to the endeavours of Major Sandeman to throw light on so interesting a problem, and for his intelligent and enterprising conduct in geographical research.

Mr. CHRISTOPHER T. GARDNER said that for the last seven years he had made a special study of Chinese maps. In those maps it was set out distinctly that the Sanpo flowed into the Gangla. There was a large intervening blank where the Brahmaputra ought to be, but near Dakka was the Gangla river. It was therefore evident that the Chinese geographers regarded the course of the Brahmaputra and not that of the Irawadi as the continuation of the Sanpo. The rivers from Yünnan, however, were represented as flowing through Burma. He thought Chinese geographers were to be trusted. He had compared the Russian maps of Central Asia

with the Chinese maps of the same regions, and they were almost identical, the only difference arising from the bad draughtsmanship of the Chinese.

The PRESIDENT, in moving a vote of thanks to Major Sandeman, said that, able and interesting as the speeches just made had been, it could hardly be considered that they had had a discussion, because only one side had been maintained. The single contention on the other side appeared to be that it was impossible that the basin at the head of the Irawadi could supply such a vast body of water as was found flowing at some distance above Bhamó. He himself had no knowledge of the country and not much on the subject, but he had often considered a similar problem, as a salmon fisher, in shorter rivers. From the sea to Bhamó was 800 miles, and from Bhamó to the source of the river was 400 miles more, or one-third of the whole. He ventured to say that a much smaller proportion than one-third of the course of the Spey supplied by far the greatest quantity of the water that flowed down that stream into the sea. He had constantly seen the Spey rolling up to its extreme banks while all the tributary streams along the lower and longer portion of its course were hardly flowing at all. Either from the melting of the snows or the rain in the mountains, the upper part was full while the streams feeding the lower part of the main river were almost dry. At Bhamó the Irawadi was only 500 feet above the sea. The fall therefore thence must be very gradual; and the sources many thousands of feet higher up. In England the rule was that the rainfall diminished three per cent. for every hundred feet of diminished height. From the central point of the highest ridge the quantity of rain diminished steadily in that proportion towards the east. That of course arose from the fact that the great supplies of rain came from the west, and the clouds breaking on the high lands decreased as they travelled east. Although that reasoning would not exactly apply to the Assam frontier, it did to a certain extent. In mountainous regions a far larger quantity of moisture fell than in low lands. In the case of the Irawadi the high region was about the source of the river, and it did not appear to him to be extraordinarily wonderful that, at 800 or 900 miles from the sea, there should be a great stream fed by a catchment basin of only 300 or 400 miles, if it came from lofty mountains. To set up the argument that the Salween and the Irawadi were one and the same stream, in the face of the great body of evidence to the contrary, direct and indirect, that had been offered, was to say the least extremely presumptuous.

*The Elephant Experiment in Africa; a brief account of the Belgian
Elephant Expedition on the march from Dar-es-Salaam to Mpwapwa.*

By L. K. RANKIN, B.A. Cantab., F.R.G.S.

ON June 7th, 1879, Mr. F. Falkner Carter, who commanded the Belgian experimental elephant expedition which came to an end with the death of the leader,* called on me at the Universities' Mission Colony at Mtwani, Zanzibar, and asked me if I could accompany him as "second in command." I willingly accepted, and with Bishop Steere's courteous

* For an account of the manner in which Captain Carter met his death at the hands of a war party of natives, accidentally encountered on his return march from Tanganyika, vide 'Proceedings,' vol. ii. p. 626. The extracts from his diary, published in the same vol., p. 761, contain the only detailed information that has come before the Society regarding this important expedition. We are, therefore, much indebted to Mr. Rankin for submitting his very full and interesting narrative of the early part of the journey, which, for want of space, we are here only able to give in an abridged form.—[Ed.]

consent, the conditions were soon arranged. Before this date the four elephants presented by the Bombay Government to the King of the Belgians had already been landed, not without adventure, at Msesani Bay on the mainland, and thence marched to Dar-es-Salaam, where they awaited our party.

On June 25th, the Belgian International Expedition under M. Popelin having started a few days before, we landed at Dar-es-Salaam. Including Mr. Carter and myself, we were some seventy-five in number.

On July 2nd, all our preparations being completed, the start was made. It was a stirring moment, even to Europeans, when about one o'clock the four elephants moved off, three laden with packs, and the fourth, used by H.R.H. the Prince of Wales when in India, carrying Messrs. Carter and McKenzie, our large Belgian flag flying, and all the black porters, Indian mahouts and coolies, and Arabs tramping off at a swinging pace. I remained behind for an hour to collect the remaining odds and ends, and finally brought up the rear with some *askari* (soldiers) and two pack donkeys, being escorted out of the village by the local magnate or Akeda. I brought the party into our first camp at Ugongo by 9.30, about five hours behind Carter, though the last stragglers were not fetched in till half-past ten; their loads had really been too heavy for them.

On July 4th we left Ugongo (8 miles from Dar-es-Salaam), where we were delayed two days discarding "luxuries" (i.e. in Africa, the least essential "necessaries") and rearranging bales, several of which we had to leave behind, the porters now carrying exactly 60 lbs. apiece.* Our march was a triumphal progress, all the numerous villages emptying themselves to see the strange procession pass. We could see the people, weapons in hand, running along on either side of our path and keeping up with us at a respectful and safe distance in the jungle. Here the scenery, with its low irregular blue hills in the eastern distance, and its near hills and dales, recalled Yorkshire to one's mind. At a "soft" place in the road constructed at the expense of Sir Fowell Buxton and Mr. Mackinnon, on which we had now entered, occurred the first mishap with the elephants, soon to become a frequent incident. The first three elephants crossed it safely, though with increasing difficulty; the fourth sank into the bog up to the root of his tail. All flew to the rescue, the mountain of baggage, including four large "elephant-cases" and the Norton's pump, was swiftly unriggered, and strewn around; and thus relieved, the ponderous brute, with much fatigue and some roaring, extricated himself. One of the donkeys too, sank into the mud up to his girths, and had to be similarly helped out; he looked very crest-fallen after it. We camped at Kisiravi at 2.30; curious crowds watched Carter and myself washing. Here the country was densely

* In Africa the traveller's track is marked by abandoned bales, as it is by horses' carcasses in the Pampas, and by those of camels in the Sahara.

wooded, the blue water-lily (called *yungiyungi* in the native language) was seen; the people carried bows and poisoned arrows, and were quite bushman-like.

For the first 41 miles we followed the splendid road already mentioned, that is to Vikeruti. Day after day the same things occurred; similar mishaps with the elephants; sometimes it took an hour or two to extricate them by means of causeways of lopped tree-trunks and boughs; sometimes two would sink into a bog in different places at the same time. The sagacity of the elephants was great; they sounded with their trunks a doubtful spot, and felt it with one foot, while nothing could induce them to cross a place they had decided was "rotten." One male elephant—"Sundar Gáj"—had a very bad temper, and was given to bolting into the jungle. On these occasions the blows and goads of the mahouts, by no means sparingly administered, were powerless to restrain him; heavy spiked iron bracelets and chains had then to be clapped on. Persuasion—applied through the female, whose name I think was Susán Kalli—alone availed. She would fondly rub her head against his, and then "give him a lead" up to the objectionable bog or ford; but even her coaxing failed sometimes, and then we had to "go round." Once it was tried to drag him backwards with a chain round his foot, but he being the stronger, dragged the female.

The damage caused by their passage through rice and corn fields was sometimes considerable, and always necessitated payment to the hornet-cloud of buzzing natives, and occasionally the purchase of the trampled patch. On occasions when an elephant, perhaps two at once in different directions, lay floundering in a bog and all the packs were strewn around, the natives, excited about their crops, would crowd round and cry with menacing crescendo, "Mhongo! mhongo!" i. e. compensation! I have known matters wear a very threatening aspect for a time, e. g. in Uzaramo, in parts of which white men had never been seen before, and where one, a Mr. Mason, had been murdered; but the presence and the resolute, watchful attitude of a number of men with guns protecting the goods, perhaps suggested that fair means might be exhausted before force was tried.

Mr. Carter had in a very large measure the capacity for command, not only of the wills but also of the affections and fears of his subordinates. The result was seen in our camp, which was orderly, quiet, and disciplined, instead of being, as a camp with so many wild spirits might have been, a pandemonium. Yet I must not omit to mention as probably a potent reserve force Dr., now Sir John, Kirk's known interest in the enterprise, as shown in his personal solicitude and address to the men before quitting Zanzibar. Had Mr. Carter lived to write a book, I am sure one of his first thoughts would have been to testify to the value of Dr. Kirk's services to and sympathy with the expedition, and to his great personal kindness and hospitality toward himself. We often spoke

over our camp-fire of our common indebtedness to H.B.M. Consul-General and his lady, who dispense hospitality and sympathy with so much kindness and tact to the many birds of passage who alight at Zanzibar.

My experience of the negro porters is that they are remarkably good fellows at bottom and, though timid, staunch and loyal. But to bring out these qualities, a thorough mutual understanding is required, based upon a clear conception as to who is "master"; that settled, the guiding hand must be light, though "masterful." In this and many other respects they are very much like children—very lovable when well under control, but otherwise very tiresome. Happy-go-lucky is their character to a T. Careless and thoughtless, they will grumble at a long march; yet, aware that dawn will bring another, they will sit awake all night singing and droning their rambling, repetitionary monotones, or telling stories which vie in suggesting new terrors ahead. As a result of this, some of the more timid have by the morning chosen the better part of valour, and discreetly bolted. When a new country is about to be traversed, every Mpagazi (porter) becomes a Cassandra. Several times our camp was burnt about our ears in the night, to the imminent danger of our baggage-pile and powder-kegs, owing to their careless habit of going to sleep with a big fire blazing in the small straw hut.

On July 7th we reached the end of Mackinnon's road, camping two miles beyond Vikeruti at Mr. Engineer Beardall's, who treated us with great kindness, and was of great assistance in supplying a much-needed gift of axes, and in obtaining our men the food which the neighbouring villagers were very reluctant to furnish. We stayed two days here clearing jungle for the passage of the elephants. The thermometer at night stood between 56° and 60°.

After leaving Dohera on July 13th, we saw much cultivation of maize, cassava, millet, peas, mangoes, bananas, and the tobacco-plant. The native men were tall, with hooked but flattened noses, and with Vandyke beards; their hair was dressed just like that of the women, who were squat and ill-favoured. The country was fairly open, village and hut-clusters frequent, and the people numerous. Their arms consisted of bows and arrows and spears. We specially remarked that they had no eyes at all for the white men, although they had never seen Europeans before, but only for the elephants. We noticed a highly aromatic plant, with a smell like that of thyme, but much stronger, and with hairy, purple stalks, the native name being *arcazamudi*. I mention the plant as it is reputed a good native cure for pains in the stomach.

We had now, after a gradual ascent all the way from Dar-es-Salaam, reached the edge of the Kingani river valley, which lay, with a sudden drop, 200 feet beneath us. From the village of Chirwalé the eye could travel some eight miles to where the river meandered amid numerous timber-belts in an extensive grassy plain. There

were signs of game, said to be plentiful here. The same night we made the Kingani ford, some 50 miles as the crow flies from Dar-es-Salaam, having covered 78 miles. The bearings of the place, by name Gungu (chief Mtitu), were calculated as lat. $7^{\circ} 2' N.$, long. $38^{\circ} 37' E.$ The river is here about 70 yards wide, very rapid, and makes several bends. Next morning only two canoes were to be had, and these most unstable. We stretched a rope across the river, and ferried the canoes across by it. One canoe upset, its nine occupants, with baggage and guns, falling into the water; but cries of the much-feared *mamba* or crocodile soon brought them to land, the canoe being recovered lower down the stream. I watched the passage of my guns with much anxiety. Their escape of a wetting was very narrow, as indeed was my own, the overladen canoe rolling from side to side, with the water within an inch of the gunwale; twice it was all but over! The elephants swam across, amusing themselves for some time washing and floundering about.

A splendid, likely-looking game country was now traversed, with fine green grass, plenty of trees, and dense cover.

The same day the river Lungwengere, famous for crocodiles, was reached, a very swift stream, at the point of crossing about 12 yards wide, with banks 12 feet deep. Our passage over a very clever but difficult tree-bridge occupied two hours. The elephants forded, an incline being dug for them in each bank. We camped at once at Kidama Chakawéwa. Near the Kingani and Lungwengere there is plenty of bird-life, notably pigeons, parrots, and ducks. We remained a day encamped by the Lungwengere, which Carter and I devoted to the search of game. Going in different directions, we saw giraffe, zebra, and wildebeeste, but got nothing, except a considerable degree of fever, the result of the day's stalking under a burning sun without a drop of water being met with.

On July 17th we first saw the tsetse-fly, in a belt of country infested by it, through which we had been marching since crossing the Kingani. We were now face to face with one of the three problems the expedition had specially to solve, viz. could the Indian elephant, being removed by long captivity and by its artificial treatment from the safeguards of the wild state, resist the attacks of tsetse, or would he, along with the ox, the horse, and the donkey, succumb to them? The problem was solved, and that in the hoped-for manner. The fly swarmed on the elephants till blood trickled down their flanks in a constant stream. For days they endured this; and yet they showed no prolonged signs of tsetse-poisoning—lassitude, melancholy, running at the eyes—either at the prescribed time, viz. eight days, or afterwards, though they seemed pained and distressed during the infliction. The donkeys, on the other hand, sickened more and more after this, and at Mpwapwa were in a dying condition.

We were now near the Lungwa river at Charinzi, where food was

very dear; and at our next camp in the jungle—a halt made for the sake of the elephants, water being reported absent ahead—the water was almost undrinkable, being strongly alkaline, slimy, and very nauseous to the taste. I was unable to get through my cup of tea. Wild pigs were numerous here. The night temperature in the tent was 62° F.

On the 19th we travelled along the foot of a range of fine hills about 2000 feet in height, and densely wooded to the summit. A specially fine conical mountain lay to the left of our course, which was north-west by west. The country was Ruvuma, and the people Wakami. The Bagamoyo road lay three days' march to the north-east.

The next day's march was through a lovely hill country; precipitous ascents and descents alternating with the loveliest valleys glowing with ripe corn, and dotted with frequent knolls, each crowned with a nest of huts and girt with the usual *boma* or palisade. The waves of golden corn rolled right up the hillsides to the summits; and a charming stream flowed through the centre of the valley. This was the most lovely natural garden I have ever seen, with its glowing millet fields filling every hollow and dell and brightening up the slopes of every knoll, with its lines of fresh bright-green banana-trees along the stream banks, the whole enclosed by huge walls of purple tree-clad mountains. I was told the mountains were called Ukangu. South-east by east lay Luhaki, and south-west by west were the hills of Luguru or Ruguru. The nearest village was Makoka, where we camped in a completely enclosed vale of about 1000 yards in length. The next day's march was through a similar series of picturesque valleys, to all appearance the abodes of peace and plenty. The people crowded together among the tall corn to look at us, but rushed away on the least movement of the elephants. So calm and peaceful were these rural vales, shut in by the girdle of hills, that the inhabitants could, I think, forget in time that there was a world beyond them.

Our next camp was Tumundu in the district Kikunguri, chief Aceda Murumu; it was on the line of the lower road to Bagamoyo. The temperature was 89½° F.; height of position between 800 and 900 feet. We had seen much quartz, and the red sand seemed to glitter with gold-dust, but I fancy most of it was mica. I was much struck by the decayed, desolate look of the forest trees, most of the leaves were fallen, and the boughs broke at a touch—the only life they seem to possess was in their thorns, some of which were straight spikes 8 inches long. For the first time we now began to see giant creepers. After passing some conical mountains we came to a tract of forest where every tree was hung, festooned, smothered, shrouded, enlaced, draped with convolvulus; tree was linked to tree in the most extraordinary manner, and the ground carpeted with the plants. We here saw tsetse again. On July 23rd we left Kiroka (Kungwa Valley) where we had encamped near the mparamusi tree mentioned by Cameron according to my informants. We traversed a

great deal of very dense jungle, and our elephants had some extremely stiff climbing, which no other pack animal, I consider, could or would have accomplished. We saw some wild cherry-trees (*kunazi*). On our right—i. e. north-east to north-west—stretched a vast expanse of dead-level tree country, from which stand up three isolated cone-shaped mountains, bearing N.N.E., the middle one standing more apart: to the north is a solitary peak, and to its right in the far distance a short range of high mountains rises from the horizon. We had passed several gullies and torrent beds, and now, after leaving the circular stockaded village Kigambi of the Wakami, we reached a splendid stream fresh from the mountains, pebble-bottomed and clear as crystal; and in the distance a torrent was seen rushing down the mountain—this river was the Ungorori and the camp Muhalleh. The night temperature was 58°.

On the morning of the 24th, starting at 6.55, we crossed by a fifteen yards wide ford, and thoroughly enjoyed the lovely spectacle of sunrise among the hills. The mountain range on the left of our path was a constant feast to my eyes as we proceeded. As the mists rolled up the lower slopes, its giant proportions revealed themselves in all the contrasts of massive spur and sharp arête; while silvery threads marked the distant course of brawling burn and babbling beck, of roaring torrent and swirling cascade.

The first village of importance was Simbamwenyi (stockaded), 1400 feet above sea-level, according to Cameron, and lying at the base of gorgeous hills. The houses were circular, with dome-shaped roofs ending in an apical pole which supported a Mahomedan crescent. We rather hurried past Simba, whose reputation is not too good, and just beyond it crossed a fine stream running north by east, the Lungerengere, I believe. A fine group of four mparamusi trees attracted our notice, as well as the large quantity of tobacco growing. The inhabitants of Simba—Wazigua—file the teeth to a point. We camped about one hour west of Simba on the Lungerengere, here flowing north-east by east. The people were ugly, with long noses, and looked suspicious and timid. At our camp Carter received a reply from Captain Popelin, of the Belgian International Expedition, to whom he had written from Tumundu on learning his arrival at Mikeseh. The night temperature was 44°.

We left Ugerengere on July 25th. After passing Simbo, a small *tembe*, or stockade, we camped at Mizinga, where the night temperature was 55°. Near this we saw the first fan palm; they became plentiful afterwards, throughout the Mkata plain, a swamp when Cameron passed, but now dry and cracked with the heat. Speke's "umbrella trees" were numerous, and sparse tree-belts were scattered about, with numerous heavy-game tracks. On emerging from a tree-belt, a herd of six giraffes was descried about a mile away, staring at our elephants in amazement; they evidently could not understand the men and loads on their backs.

Carter and I quickly mounted the leader elephant, inspected the giraffes with the field-glass, and with rifles ready set off after them. But after staring some time they made off and were soon lost to view; upon that we gave up the chase.

A tree-belt marked the course of the river Mkata, which we soon reached; here was clearly the true Mkata swamp; the part we travelled over showed no sign of having been a swamp for some time, the presence of grown trees and absence of reeds and marsh-grass suggesting this opinion. Tracks of rhinoceros and elephants were numerous, while the grass was crushed down in every direction by the recent couching of heavy game. Two or three drops of rain were the only local result of very heavy rain-clouds which passed over us. It was lovely park-land, and resembled home-scenery. In the river-bed the water lay in big pools, frequently disappearing under the sand, in particular at the crossing-place. Some natives seen only boasted one gun among the general armament of bows and arrows: they looked on, saying nothing. Millet (*mtama*) strewed the ground, far more being "down" than could possibly be threshed for many a day.

Again the path led to the river, here very strong and rapid; a cleverly-constructed but very narrow and difficult tree-bridge enabled us to cross dry in about two hours. The men were much afraid of crocodiles (*mamba*), with which the stream was said to swarm. A native, on the other side, with whom Carter wished to speak, would not cross until he had sent for and chewed some green-stuff, which done he spat it away and plunged into the water. It shoaled rapidly, at two and a half yards from either bank being much beyond his depth. The elephants forded at a spot 20 yards up stream, and as no man would swim the donkeys over, the female elephant towed them by a rope with her trunk. The ford was near Kukonga, which lies back, hidden, in a bend of the river. The plain here is scrubby. Four giraffes, perfectly dazed, stood about half a mile off looking at us. There was much bird-life here, with quacking of ducks and cooing of pigeons. At Komberinha, half-a-dozen vultures perched near our camp; and we saw a wild African elephant's foot-mark half as large again as those of our animals, though these were over eight feet high. Monkeys were for the first time seen here.

Passing the villages of Kamohina, consisting of about twenty-five round thatched houses, and Kwarigobi and ten other hut clusters, we reached Seyyid Barghash's town of Akeda Ferhan,—where the Arab flag was flying—situated amid a very garden of sugar-cane, millet, Indian-corn, cassava, peas, melons, pumpkins, saffron, castor-oil plant, papaw, cotton, and tamarinds. We passed through and camped at Useghara kwa Ferhan. There are here two pretty streams—the Lunga just before Ferhan, and another on the way to Mvumi—where the courteous Arab governor, Seyyid Ali bin Omar, who rendered such kind assistance to Cameron, and to whom on my return I also was much indebted,

represents the Sultan of Zanzibar. Splendid specimens of *Solanum nigrum* and of tamarinds, also tomatoes (*nyaya*) were noticed, and a broad-bladed grass of styptic fame called *Micanga mwitu* (i. e. forest rice).

Against a large bloated baobab was propped a striped rod, about three feet long, lying horizontally, with its other end supported on a branch of a shrub; three hollow globes with a hole in them were spitted on one end from which also projected a feather. This was *dawa* or "medicine," i. e. a protective charm. At Mvumi (Kwam Tupa) were three mparamusi trees.

After passing Mirombo and Wangwana Silamu, we camped near Tupa, three hours from Useghara kwa Ferhan.

Here the dignified and courteous elder brother of Seyyid Ali called on us and had a long palaver, his motley following crowding the entrance of the tent. Only one or two of these Arabs could understand Arabic. After coffee had been handed, the elephants were put through their drill, saluting (*salaaming*), &c.; while I made up some medicines for Seyyid Ali, who had been for some time ailing with an obstinate attack of dysentery. On repassing that way I had the satisfaction of receiving the Governor's grateful assurance of the benefit he had derived from my medicine (*ipēcacuanha* and opium). I need hardly say we were the best of friends and parted with mutual regret.

Poor Carter, who was thoroughly alive to all the probable results of the expedition, anticipated that henceforward Arab local chronology would date from "the year of the Elephants."

Seyyid Ali bin Omar is a young, very bright-looking, laughing Arab of about thirty years, with large, eager brown eyes, in manner very courteous and affable, at ease yet dignified, imperial but not imperious, and seemingly much liked and respected by his *entourage*. In the evening he paid us a visit, walking the mile and a half from Mvumi. A less interesting visit was that of the black chief Silamu with a dusky retinue, Carter's "dark séance" as we called it. We tasted their *pombe* or native beer, and thought it very intoxicating; it was like fallen peaches stewed. The native water-pipes [Kiswahili = *kiko*] were very curious, being made of gourds of various shapes. The smoker swallowed the tobacco-smoke, which caused a violent fit of coughing, and in this paroxysm of coughing the pleasure and luxury seemed wholly to lie. Here Carter and I made another attempt to find and shoot some guinea-fowl, report crediting the country with plenty; but as usual, we did not succeed in seeing any, and so finally concluded their existence was one of the fictions of the country. On the 30th, after leaving Tupa, we passed a few villages all stockaded, one especially, where we first struck the Mukondokwa river on its left bank, being shrouded in dense leafy bushes, the narrow entry looking out between bananas, whence huddled women timidly peeped. Here the river is 90 to 100 yards broad:

the ford is up to a man's hips. The view north-north-westward and up the river was very charming. The Mukondokwa valley presents a continual ascent, opening out, as Muinyi Useghara is neared, into a broad smiling vale rich in crops—of corn, castor, sugar-cane, rice, semsem, cotton, bananas, pumpkins, *Amaranthus melancholicus* which makes a good salad, and forms trees similar to the copper beach: while the tall reed-grass was in flower. Stockaded villages crowned all the knolls—which were ubiquitous, some twenty-six occurring on this march alone—and many others nestled in the dells. Cattle and large herds of goats were plentiful. We saw the fan palms, mentioned by Cameron, which have a huge bulge or swelling about three-quarters up their trunk; one had fallen. The roofs of the huts here became more conical and less dome-like. The hills, despite their clothing of trees, look very sterile; black and white primitive rocks prevailed. At the last ford before reaching Muinyi the river was very broad and shallow. Muinyi, under the Rubeho mountains, lies on an open plain surrounded by lofty hills. After leaving Muinyi a very noticeable landmark was an mparamusi tree formed by the union of three in one. Between Muinyi and Rumuma—our next camp—i.e. in the upper course of the Mukondokwa, the path crossed the river many times. At one point the path—which Cameron mentions as rather precarious even for porters, leads for some distance along the steep hill-side immediately above the river, whose bank on this side, though not very deep—5 to 10 feet, perhaps—is sheer, and the stream full and strong. The elephants, whose loads spread out on either side of them some five or six feet, though rendered insecure from this cause, safely passed along. But in one place a dry torrent-bed, forming a deep rift across the path, which, in avoiding it, followed an acute angle, compelled us to cut away the steep hillside a little to enable the elephants' packs to clear it. Yet amid their many real trials of strength, difficulties, and occasional danger, as they clambered up and down, over boulders and tree-trunks, across treacherous bogs and shifty, stony torrent-beds, and up hills which made them pause, look round for help, and trumpet with remonstrance—amid all this these noble beasts at all times exhibited unfailing judgment, patience, and willingness. Their pluck under their too great labours compelled an admiring pity for them. I mention these facts to show the splendid qualities of these grandest of "weight-carriers."

The huts about here were mostly round, with dome-shaped roofs; some were oblong. The jewellery worn by the natives was very elaborate; the favourite piece was a neck-plate, consisting of flat rings of brass wire concentrically arranged to form a large flat plate. One which we saw on a small child measured quite eight inches in diameter. Bracelets and anklets, both reaching far up the limb, were common. The men confined their adornments to their ears, which were slit and stretched to a hideous degree, to hold earrings in the form of silver plates of flower

and other patterns as large as a crown-piece, or in that of a brass cylinder looking like a rouleau of coins, or of a small goat's horn like the native cupping-horns. As we passed Kiresho a group of natives with broad faces, high cheek-bones and slanting Mongolian slit eyes, at once caught my attention. Huge cacti and baobabs were numerous, and a small wild aloe which, when the green skin is peeled off, I was told is an ice-cold and healing application for burns. Our porters warned us against a bean-like, hairy, S-shaped (S) seed-pod of a creeper, as having severe stinging powers; it was about four inches long, yellowish brown; they called it *upupu*. Happily the pain yields to two procurable remedies, cowdung and wood-ashes. Here, close to Rumuma, the river rushes over a splendid natural weir. The aneroid registered on August 1st 27 $\frac{7}{16}$; and the night temperature outside the tent was 56° F.

At Kirasa and Kiroo we saw European waggons, and found they had belonged to Mr. Roger Price's party, upon whose "road" we now were. I believe this place marked the limit reached by the bullock-waggons of that party; oxen would ill have been able to drag them further along the so-called road which was scarcely wide enough for even a small cart. For the elephants to pass, we had to widen the road considerably, and to do so cut down large quantities of trees. I can safely say that where our elephant caravan passed through the jungles a thoroughly serviceable 12-foot way, free of trees, marked our track,—and that, all the way to Mpwapwa (Mpamvua). At Rumuma I again saw tsetse fly, an observation which M. Broyon's experience confirms, he having lost some oxen through the fly after bringing them safely all the way to Mpwapwa. Beyond Rumuma the ground was quite white with salt; and traces of heavy game, among them hippopotami spoor, were numerous. There was hardly a leaf on the trees in these dry highlands of Useghara, nothing but dense grey thorn-jungle, covering the sterile rolling hills piled around; away south-west by south was a fine plain. The hills were granitic with much quartz; the sort of country in which one would expect to find gold. I shall not readily forget the thorn-jungles of Useghara! Every tree is a wait-a-bit thorn-tree: I was nearly torn off the elephant once, a thorn having got hooked in my eye-lid, and as the elephant was striding rapidly along, nearly tearing the eye-lid off; I happily unhooked it just in time. The hard, woody spiked point of a yucca-like reed-grass called *miombo* ran into my knee, making me very lame for four or five days; the pain kept me awake all that night. This *miombo* is plentiful as you approach Lake Ugombo, and superabundant on the shores of Lakes Kimagai (Iramba) and Ngiha, of which, I believe, M. Broyon was the discoverer. When beaten, rubbed, and twisted, *miombo* makes splendid rope and cables; we made a very long and stout rope of the grass. The inner bark of the acacia also makes fine strong rope; while excellent material for sun-blinds, &c., is furnished by the stalk of a tall lanceolate-leaved reed-grass, with a flower-head

suggestive of pampas-grass and called *mdete*. Mr. Last gave us much information about the uses of *miombo* and *mdete*.

In crossing a river to-day a typical accident befell the author of so many of our disasters—the male elephant “Sundar Gáj,” better known as “Old Musty.” In the words of my diary: “I was sitting on the elephant and waiting till the others should have crossed the river and come up, when suddenly urgent shouts from Carter for ‘Jemadar!’ (the head mahout) and ‘Buchiet!’ (the head of the elephant gang) made me slip down from the elephant and run back to the river. There I saw “Musty” rolling helplessly in the stream, his off-legs sunk inextricably in the mud, his pack half under water, and only one side of his head above the surface: his efforts to free himself only made him roll over more, and his head sank under water, only his trunk appearing, a signal of distress. We thought he would have been drowned. The men dashed into the river and unfixed the pack. It took three-quarters of an hour to get his load to the bank, now several hundred pounds heavier than before, by reason of the long immersion. Curiously enough, neither my tin box with books and instruments, nor my cartridge magazine got wet. The cause of the disaster was that this obstinate elephant would follow in the track of the three others up the precipitous and yielding bank; this giving way, he rolled back and down into the stream.”

We camped at Lake Ugombo on the edge of the lake: the natives called the locality Matamombo. The night temperature outside the tent was 41° F. I found it intensely cold with all my clothes on. There was a dense penetrating mist from the lake. The return of morning revealed a beautiful sight, the placid lake reeking with vapour, and the hills and slopes that faced east being grandly lit up and empurpled with the rising sun. Hundreds of water-fowl, —large white cranes, brown and white geese, cormorants winging their heavy and solitary flight; while clouds of ducks whirled and wheeled in their hosts in search of their morning meal among the mud and sedges. Hippopotami grunting amid the reeds were heard, but not seen: however, Carter shot two that were some way out in the lake. The porters, fearing crocodiles, would not, though badly off for food, go into the water after them. Subsequently, at Kimagai, Carter saw thousands of birds,—ducks, geese, cranes, and strange herons, black swans (which Stanley mentions), and a strange eagle, as Carter believed, with wattles, like a turkey. Between Lake Ugombo and our next camp at Simba on the Ugombo river, a high table-land of red sandstone was traversed: a tree-plain stretched away south-west, and there was much scrub and bush affording cover to the swarms of bird-life with which this region teems. We noticed guinea-fowls, quails, cranes, kites, parrots with black, green, and gold plumage, a bird like grouse, and pigeons, of which one sort had lovely gold-green plumage.

On Sunday, August 3rd, we left Ugombo river at 7.20, on our last stage for Mpwapwa. Most of the way led through a dense thorn-jungle, whose impenetrability will be realised when I say that our porters reached Mpwapwa five hours before the elephants, although on the flat where there is not much cutting these animals, with their steady pace of three miles an hour, can easily outwalk the porters. And this despite our strenuous exertions to reach the long sought goal. The porters got in at 11.30 A.M., we at 5.45 P.M., after a march of 10 hours 25 minutes. The elephants required a road about 12 feet high by 11 feet wide. The path, on our arrival, was only a foot-track along which one had to brush through the thorns; our passage in this part of the caravan route would convert it into a very fine road. The approach to Mpwapwa lay along the broad, sandy bed of the almost dry river, now about four feet wide, close to which on the level we pitched our camp. Our entry was a triumphal one. The elephants, grand in their ponderous strength and docility, strode along in single file; our Belgian flags were flying in the breeze; the dark, yet alien, Indians and the disciplined body of Arab "elephant-men" with axes and billhooks, Carter and I on foot in rear and van respectively, the little band advanced in silence, conscious of having accomplished the first section of our great journey in half the time expected.

Rest and reorganisation were necessary after the laborious march in order to prepare for perhaps yet sterner work. Especially necessary was this the case with regard to the elephants, who were very thin, and to the porters, after their thirty-three days of almost forced marching. We meant to take twelve days' rest; but owing to the non-arrival of the Belgian International Expedition under Captain Popelin and Dr. Van der Heuven, and of our goods from Zanzibar; and also to the grave illness of the Belgians with whom we were to join forces in passing through Ugogo,—a month of chafing and impatience was wasted there. During this time we received exceeding kindness and attention at the hands of Mr. J. F. Last, of the Church Missionary Society, who almost maintained our expedition during its stay. At Mpwapwa our first task was to draw up the "Report" for the King of the Belgians, of which unfortunately I have no copy; but I remember it contained the words—"The elephant experiment has now been proved a complete success," an assertion which Carter justified on the three counts of (1) Their immunity against tsetse after twenty-three days' exposure to that insect; (2) their maintenance during one month mostly upon the uncultivated food of the country, and therefore at little cost; (3) their ability to march over all styles of ground, soft, stony, sandy, boggy; to conquer all eccentricities of topography—hill and dale, river and jungle—while labouring under double their due weight of baggage, some 1500 instead of 700 lbs.; and this in a style that no other beast of burden could hope to emulate. At this distance of time, and notwithstanding

the subsequent death of three elephants and the discontinuance of the experiment, I see no reason to withdraw a word of Carter's claim to success.

A great deal of my time was occupied in making out the "Statement of Account." I here give a *résumé* of it, as showing how small was the cost of the expedition on the march, and how notably trifling the elephants' share thereof, viz. some 25½ rupees.

COST OF THE ROYAL BELGIAN ELEPHANT EXPEDITION FOR ONE MONTH, i. e. FROM JULY 2 TO AUGUST 3; ON THE MARCH FROM DAR-ES-SALAAM TO MPWAPWA.

	R.	A.	P.
Meas of caravan for 33 days; average number of men 87; extremes 79 and 90; at 10 pice per diem	275	13	0
Hire of temporary porters	133	12	0
Engagement of extra porters (8 deserted, 2 dismissed)	155	8	0
Keep of 13 Indians	69	7	2
Cost of 4 elephants, including keep and fines for damage to crops	25	8	0
Commissariat of 2 Europeans and one other	47	11	2
Sundries	33	0	0
	<u>R 740</u>	<u>12</u>	<u>0</u>

This = 57½ odd; which gives for a year's cost at same rate 685½.

Our "CLOTH" expenditure, which is converted into money in the above account, stood thus:—On leaving Dar-es-Salaam we had of

	Dotl.
Amerikani, 13 bales, each of 6 pieces, each piece of 7½ doti	585
Satiné, 18 bales, each of 7 pieces, of 9 doti each	1134
Total	<u>1719</u>

On our arrival at Mpwapwa we had expended 431 doti, leaving only 1288 doti.

Carter and I had always said "our troubles will begin at Mpwapwa." Our fears were realised, though not from the source we had anticipated, at least as regards the most serious trouble—the death of our finest weight-carrying elephant. Our brilliant Report had been despatched between the 5th and 10th. On the 11th, Carter went to Lake Kimagai with two elephants to get miombo grass for rope-making, and to see the lake and shoot. At sundown on the 12th the elephants Sundar Gáj and Nadir Baksh returned laden with miombo, both seemingly well. On the 13th, about 5.30 A.M., my servant awoke me with awe in his face, and in a ghostly whisper said—"Bwana! (Master!) the big elephant is lying on the ground; the Hindi don't know what to do, they think he is dead!" It was too true. Seen standing at 3 o'clock that morning by the Indians, now, at half-past five, his mighty carcase lay motionless on the earth. Sundar Gáj, our giant-comrade in many labours, was dead! After a few moments' sad and silent contemplation of his lifeless bulk, I began the work of inquiry. In the subdued circle of solemn faces around me, it was to the Indians I turned for their opinion. I saw no signs of a violent death, no external sign of the cause; he had fallen without a struggle, for the soil was not disturbed. Around him

were the leaf-boughs of a tree which the Indians said had been their food since Dar-es-Salaam. A message, in which I proposed a post-mortem examination, despatched at once to Lake Kimagai, brought an answer that Carter would return about 4 P.M., and had ordered the removal of the tusks, the amputation of the feet—it being necessary to send all these to Bombay—and the excavation of a grave. The first two tasks I personally performed; our porters could scarcely be compelled even to lend their knives. The grave was not ready even at 10 P.M. Early next morning I set about the dissection, which proved no easy task. The whole business took me two days, and poisoned my finger into the bargain. The heart weighed 31 lbs. and was some 16 inches long; I did not consider it diseased. The opinion I formed then and still retain was that Sundar Gáj was a victim of too-herculean labours and of an insufficiency of food. This opinion—which reflects upon the Indians infinitely more than upon Carter, who, as being ignorant of elephants' habits, left to them the treatment, and referred to them for guidance in the case of these animals—receives support from the following considerations:—(1) that a second elephant died soon afterwards; (2) that they had been stall-fed in India, on white bread, &c., the fat of the land in short, and then after only a short gradual reduction at Dar-es-Salaam, had had to forage for themselves, very little corn and rice being bought for them; (3) that whereas, according to Sanderson, 700 lbs.—I speak from memory—is the limit-weight an elephant should carry on flat ground for a prolonged time, these bore at first 1200, then 1500 and at one time 1700 lbs.; while they daily climbed the most tremendous hills, which no mule I think could have climbed under a proportionate burden; (4) that fat and round at starting, their backbones stood up six or seven inches from their flanks at Mpwapwa, so much flesh had they lost.

It is very important if the elephant experiment is not to be discredited and voted a failure, that the truth should be known. But for this far greater stake, I should have shrunk from publishing my opinion of the cause of death, as indirectly it fixes some responsibility for the calamity on my late chief. As he told me himself, he was instructed to take twenty spare porters lest one of the elephants should fall ill. In his laudable desire to get off quickly—the supply of native porters being exhausted—and have as compact and swift marching a caravan as possible, he did not adopt this plan. When, therefore, we found that the porters were too heavily laden, extra loads were piled on the elephants, themselves already overladen—and this, notwithstanding the numerous goods we left behind at Dar-es-Salaam. This neglected precaution was the “fount and source of the evils” which detained the expedition so long at Mpwapwa, and, I cannot but think, contributed, in the extra work it gave them, to the death of the two elephants. That sad occurrence, so soon after the despatch of the report claiming

"proof of a complete success," unless accounted for on the above hypothesis of undue packs and unnecessary privations, under both of which the noble beasts laboured, and to which they most assuredly succumbed; exposure to which would be avoided by subsequent expeditions, and might have been avoided in this instance by a little more knowledge, patience, and less fear of expense; unless thus accounted for, the fatality would be held to refute our claim to success even by the royal patron of the experiment. With the public of course, it has, I presume, always been regarded as a failure since the death of the elephants and the crowning loss of its chief. Yet it was not a failure; as an experiment it was proved possible and, may I not add, presumably profitable? It failed only as a sustained effort, and this from want of knowledge and experience partially, but from misadventure finally. The dearly bought experience would remove these risks another time. I have not the shadow of a doubt that there is yet a great future in Africa for the elephant, especially when the stage of capturing and taming the native species has been reached.

Difficulties of the problem which must be surmounted are: (1) the assumed, but by no means *proved* inability of Indians to stand the climate, and (2) their reluctance to part with the inherited lore or craft by which they control their elephants. We had a gang of Zanzibar Arabs, speaking Hindostani, specially told off to assist the Indians and learn their craft with a view to replacing them at the expiration of their one year's stipulated service; but they were as ignorant of this craft after a month as at the start, and we saw then that they would remain so. To meet these difficulties, Africans should be sent to the Bombay stables there to learn the elephant-lore. Our Indians were a great care and responsibility to us. They were always sick, always whining and complaining; often we gave them our own dinner of fowl, "galeeney," pigeons or what not; they had early been allotted our store of rice. Often our porters went empty when the Indians fared well; most days I had to doctor seven or eight of them. They took no care of themselves. With the exception of one, Luxuman, and an old man, Wazir Khan, I think they were an ill-plucked, feeble set. One of them died after I quitted the expedition; while seven of them were sent home from Mpwapwa. This left Carter with only five of the original thirteen. These must have been too few for the work, only two, I fancy, being mahouts.

Up to Mpwapwa we lost only eight men by desertion, and those fled from the anticipated terrors of Uzaramo, in the portion of which between the end of Mackinnon's road and Mikesch no white man had been before: the reputed witches, demons, and wild animals of that country proved too much for them. We were very lucky, when one remembers that Stanley lost fifty-seven on his first journey by a shorter route to Mpwapwa; while Cameron's porters deserted in batches every day.

Nor had we any deaths. Our troubles came in a cluster at and after Mpwapwa. There one of the donkeys died, on August 30th. On stepping forth from my tent one morning, I saw the poor beast just outside, his neck over the medicine-chest. In his dire need he had crawled from his own quarters all the way to my tent. I could do nothing for him; the tsetse had done their work.

I visited Dr. Mullens' grave, with its piled mound of heavy stones and strong timber palisade, proof against molestation from wild beasts.

It was winter at Mpwapwa, the night temperature 60° F. in the open air, that of the day in tent 90° – 100° F.; it was very cold at night, and comparatively cool by day (yet I could not remain in the tent for the heat), a strong wind always blowing, it was not a bit like one's idea of Africa. Yet though fever was warded off, feverishness was ever present. Until August 30th, neither Carter nor I had any illness worth mentioning, but both had been hearty and hard. My healthiness I attribute largely to the long habit of total abstinence, to dry-rubbing with a towel, changing promptly damp garments, the wearing of net vests, and having a bath only in the middle of the day or before sundown in the shade of the tent; and lastly to taking plenty of quinine.

The healthiest drink in Africa is the water in which rice has been boiled. A nightly potation of this, with as little drink as endurable during working hours, is a sound precaution against intestinal complaints. *Mawélé* (*mwere*) and millet (*mtama*), especially the red sort, are too heating for Europeans. Maize (*muhindi*) loaves made with pombé beer are excellent.

GEOGRAPHICAL NOTES.

The Survivors of the 'Jeannette' Expedition.—A detailed report from Engineer Melville, of the *Jeannette* Expedition, the first received, reached Washington on the 20th of March, and was published in the *New York Herald* of the 22nd of the month. Together with its enclosures, consisting chiefly of copies of the records left by Commander Long at the different halting-places examined by Mr. Melville in the Lena delta, in the course of his ineffectual search for the lost party, it gives much additional information regarding the proceedings of the survivors, from the time of the wreck of the vessel down to the 7th of January. We select the following from amongst the records deposited on his way by Commander De Long, as the most interesting and important:—

“ Arctic exploring steamer *Jeannette*, at a hut on the
Lena delta, believed to be near Tcholgogje,
Thursday, 22nd September, 1881.

“ The *Jeannette* was crushed and sunk by the ice on the 12th of June, 1881, in lat. $77^{\circ} 15'$ N., long. 155° E., after having drifted twenty-two months in the tremendous pack-ice of this ocean. The entire thirty-

three persons composing her officers and crew dragged three boats and provisions over the ice to lat. $76^{\circ} 38' N.$, long. $150^{\circ} 30' E.$, where we landed upon a new island, Bennett Island, on the 29th of July. From thence we proceeded southward in boats, sometimes dragging over ice, until the 10th of September, when we reached Simoutki Island, at 90 miles north-east of this delta. We sailed from there in company on the 12th of September, but that same night we were separated in a gale of wind, and I have seen nothing since of the two other boats or their people. My boat having weathered the gale, made the land on the morning of the 16th inst., and after trying to get on shore for two days, and being prevented by shoal water, we abandoned the boat and waded to the beach, carrying our arms, provisions, and records, at a point about 12 miles to the north and east of this place. We had all suffered somewhat from cold, wet, and exposure, and three of our men were badly lamed, but having only four days' provisions left, reduced rations, we were forced to proceed to the southward. On Monday, September 19th, we left a pile of our effects near the beach, erecting a long pole where will be found everything valuable—chronometer, ship's log-books for two years, tent, &c., which we were absolutely unable to carry. It took us forty-eight hours to make these twelve miles, owing to our disabled men, and these two huts seemed to me a good place to stop while I pushed forward the surgeon and Ninderman to get relief for us. But last night we shot two reindeer, which gives us abundance of food for the present, and we have seen so many more that anxiety for the future is relieved. As soon as our three sick men can walk we shall resume our march for a settlement on the Lena river.

“Saturday, September 24th, 8 A.M.

“Our three lame men being now able to walk, we are about to resume our journey, with two days' rations deer meat and two days' rations pemmican, and three pounds of tea.

“GEORGE W. DE LONG,

“Lieutenant commanding.”

Found in another hut by a Yakut hunter:—

“Saturday, October 1st, 1881.

“Fourteen of the officers and men of the United States Arctic steamer *Jeannette* reached this hut on Wednesday, September 28th, and having been forced to wait for the river to freeze over, are proceeding to cross to the west side this A.M. on their journey to reach some settlement on the Lena river. We have two days' provisions, but having been fortunate enough thus far to get game in our pressing needs, we have no fear for the future. Our party are all well except one man, Erickson, whose toes have been amputated in consequence of frost-bite. Other records will be found in several huts on the east side of this river, along which we have come from the northward.

“GEORGE W. DE LONG.”

Eight days after the date of the last record, i.e. on the 9th of October, the party, still travelling southward, were reduced to a deplorable condition, having eaten their last meat and being on an allowance of three ounces of alcohol per man per day. The commander then determined to send the seamen Ninderman and Noros ahead in search of aid at the nearest settlement, and they arrived safely at Belun on the 27th of the month. They reported that Erickson had died on the 7th. Mr. Melville started north on his unavailing search for his chief and the remainder of the party, on the 5th of November, succeeding in finding many of their halting-places, but finally being driven back by exhaustion of supplies and fearful weather about the 20th of the same month. The results of the second search, commenced in February, are not yet known.

The *New York Herald* publishes also the following letter from the seaman Noros to his family at Fall River, Massachusetts. The writer gives expression to the fears which must be entertained by all, as to the fate of the gallant commander and his party:—

“YAKUTSK, SIBERIA, January 7th, 1882.

“Dear Father,—I send you a few lines to let you know that I am alive and well. Our ship was broken up on June 11th, and left thirty-three men on the ice hundreds of miles from civilisation. We travelled 800 or 900 miles, some 300 or 400 of which we sailed in small boats, and landed on the northern coast of Siberia. One of our boats landed on the east coast; the other we know nothing about. There were eight men in the boat that is missing. The boat I was in arrived safe enough. We had fourteen men. Some of the men had their feet frozen; mine were frozen. One man died after we got on shore. We travelled about two weeks, short of food; then the captain decided to send Ninderman and myself on ahead to look for assistance. We walked 120 miles without anything to eat; for six days we had not a mouthful of food. We were most starved when found by the natives. The captain and the ten men, I fear, have died from starvation and cold. Three men—Engineer Melville, William Ninderman, and Bartlett—will remain here this summer to search for their remains and for the ship's papers. The rest of us—there are ten men—will proceed to the United States as soon as possible. We have been travelling now for over a month on sleds drawn by reindeer, and this is the first place of any account we have come to.”

Loss of the ‘Oscar Dickson.’—We are now enabled to confirm the news that M. Sibiriakoff's steamer, the *Oscar Dickson*, had been crushed by the ice and foundered on the 2nd of last August,* her commander, Captain E. Nilson, having recently made a formal deposition to that effect at Gothenburg, where he arrived safely with part of his crew from Yenisei. He states that the vessel remained where she was left by

* See vol. iii. p. 760.

M. Sibiriakoff in October 1880 * until the 28th of July, 1881, when the ice showed signs of breaking up, and an attempt was made to push into the Yenisei. This was, however, unsuccessful, and on the 2nd of August the ship was anchored at the southern edge of a floe which blocked the entrance to the bay where they had wintered. The inner part of the bay was closely packed with ice, which drifted to and fro with the tides. Towards the turn of the tide Captain Nilson observed that part of this ice was coming nearer than usual, but with such a slow movement that he felt no uneasiness, especially as the next tide would carry it back again. He nevertheless weighed anchor, and let the ship swing into a small bight in the floe, and was in the act of hauling further astern, when the drift-ice came down upon the fixed floe, and in a few moments the *Oscar Dickson* was a complete wreck. This happened at about 11.15 A.M. Fortunately she was held up by the ice, which had been forced under her bottom, and three boats were got on to the floe, though not without considerable risk. Some clothing and provisions were also saved, together with the ship's papers and log-book. The *Nordland* was still in sight about 30 miles off, but as her condition could not be ascertained, it was considered advisable to make direct for the land, dragging the boats over the ice. The ship was abandoned at 2 P.M., the whole of the after part, as well as the deck-house, being then completely under water. In about an hour's time a lane of water opened, and after a hard night's work, the shore was reached at 5 A.M. on the 3rd. The boats proceeded along the coast to "Ivanoff's Felt," where they arrived at 10 A.M.; and a telegram lately received at Gothenburg from M. Sibiriakoff states that the remainder of the crews of both ships had arrived all well at Tobolsk.

Polar Meteorological Expeditions.—In continuation of the note on this subject in our last number, we are able to report that the steamer *Pola*, under the command of Captain Franz Müller, left Pola on April 2nd, with the staff and scientific equipment of the Austrian Meteorological Expedition. The party consists of fourteen persons, Lieutenant Emil von Wohlgemuth, of the Imperial and Royal Navy, in command, two other naval officers, a surgeon, and ten sailors, nearly all from Fiume. The *Pola* is expected to reach the island of Jan Mayen early in May, and after landing the expedition, with all the stores, she will leave them to spend fifteen months in solitude, returning to fetch them in August 1883. The expenses of the expedition will, we believe, be borne by our Hon. Corresponding Member, Count Wilczek, the Austro-Hungarian Government supplying the instruments, but it is understood that all the members of the scientific staff are volunteers. Stores are taken for two years, and the expedition is provided with three boats, so that they

* See vol. lli. p. 232 (where the date is wrongly given 19th *September*—instead of *October*).

may leave the island should the succouring ship not be able to reach it in the summer of 1883.—The German Committee held a meeting at Berlin on April 13th, and they are reported to have decided to erect one observing station in the northern arctic zone, at Cumberland Sound, Davis Strait, and a second on one of the islands of South Georgia, $54^{\circ} 30'$ S. lat., $41^{\circ} 20' 15''$ W. long., and some 1100 miles east of Cape Horn. The former expedition will be commanded by Dr. Giese, and the latter by Dr. Schrader, of the Hamburg Observatory, and each will consist, besides, of six additional observers, and three or four workmen. Both parties will leave Europe early in June, Dr. Schrader's proceeding by mail steamer to Monte Video, and thence by a German man-of-war to their destination, but no definite arrangements have yet been made for the conveyance of Dr. Giese's expedition to Cumberland Sound.—We learn from Upsala that the expedition which is to found the Swedish station in Spitzbergen, will start about midsummer in a vessel specially hired for the purpose. There is good reason to suppose that our medallist, Captain Palander, who takes a keen interest in the project, will undertake to see the expedition safely landed, and bring the vessel back in the autumn. The place chosen for the Swedish station is Mussel Bay, a small inlet on the east side of Wyde Bay, on the northern coast of West Spitzbergen, where the memorable expedition under Nordenskiöld and Palander wintered in 1872-3. The building which they then erected on a small islet named after the exploring vessel *Polhem*, will constitute the headquarters of the present expedition, which is expected to reach its destination in time to commence the scientific observations by the 15th of August at the latest. Besides Captain Palander, who, as already stated, will return in the autumn, the expedition will consist of five members:—Mr. N. Ekholm, leader; Mr. E. O. Solander, in charge of the magnetic observations; Mr. W. Carlheim-Gyllenskiöld, for spectrum analysis and meteorological observations; Mr. A. Andrée, engineer, at present assistant at the technical high school, in charge of the astronomical observations; and Dr. R. Gyllencreutz, surgeon. There will also be eight subordinates, of whom at least two are Arctic veterans, having served in the *Polhem* in 1872-3, and also in the *Vega*. The Swedish expedition is chiefly due to the munificence of the well-known merchant Mr. L. O. Smith, who has placed 60,000 crowns—about 3333*l.*—at the disposal of the Academy of Science for this purpose.—Lastly, our own Government have decided to co-operate with other nations in establishing a chain of circum-polar stations for meteorological and magnetic observations. The locality selected for a British station is Fort Rae, in the north of Canada, and the general superintendence of the work will be entrusted to a Committee of the Royal Society, the Royal Geographical Society being asked to co-operate as far as regards the promotion of geographical observations.

Progress of the Lake Road between Nyassa and Tanganyika.—The important work on which our Associate Mr. James Stewart is engaged, namely, the construction of a road to connect the two great lakes, has been interrupted by a disagreeable incident, which appeared when the news first arrived much more serious than it now turns out to be. It is the massacre of a number of natives in the hire of Mr. Stewart, on their way down for supplies from Chiwindi, the first road station, to the shores of Nyassa. The first report was that nineteen had been killed, but according to a letter from Mr. Stewart of the 2nd of January, it is probable that some of the number were not killed, but taken prisoners and sold to a passing slave-dealer. During the progress of the works, many similar parties of natives had been sent down to the lake in perfect safety, but except on the occasion of the disaster they had always been accompanied by a European. It is not known what offence the poor fellows had committed to draw upon them such fearful punishment, but it is supposed that being free from control, they had been guilty of some petty pilfering. The neighbouring chiefs, however, had strongly disapproved of the act, and combined to declare war against Mwemбера, the chief in whose territory the massacre occurred. Bloodshed was, however, prevented by the intervention of Mr. Stewart, and the matter arranged, in the African manner, by the infliction of a heavy fine on the inculpatcd chief, and the exaction of a promise to keep the peace for the future. Mr. Stewart does not abate his hope of carrying out his difficult enterprise, and says he will resume operations in April or May.

Recent News from the Congo.—Just after our April number had gone to press, we learned, through the courtesy of Mrs. H. Grattan Guinness, that three members of the Livingstone (Congo) Inland Mission, Messrs. Clarke, Richards, and Ingham, had succeeded in reaching Stanley Pool in safety about Christmas. One noteworthy peculiarity about their journey is that they travelled on the south side, from Banza Manteka to a point opposite Bemba, and passed through forty miles of country not previously traversed by Europeans. They found it densely populated, villages or "towns" being passed every few miles. The people were comparatively fearless and friendly, and food was fairly abundant, large gardens in a good state of cultivation surrounding most of the towns; the tracks of elephants and buffaloes were continually seen during the journey, and sometimes the animals themselves at uncomfortably close quarters. At Bemba the party crossed to the north bank of the Congo, and finished the journey to Stanley Pool on that side, reconnoitring the country with a view to the selection of suitable sites for future stations. They walked 169 miles in all, 31 of which were along Mr. Stanley's road, now nearly overgrown with grass. Bwa-bwa-Njali and the other chiefs were at first friendly, but suddenly turned hostile and refused to let them cross to the south bank, in order to carry out their plan of returning by that way. This

action the missionaries seem to attribute to the operation of M. de Brazza's treaty, given in our last issue, and they consequently retired to the Nkemke river, near which they secured land for a station from the chief of a populous district. Before proceeding with building operations, they went on to Bemba, and letters, they there found waiting for them, determined them first of all to explore the whole of the south bank from Bemba to Stanley Pool, in order to see which would be the best way to take up the steamer for the upper river. On this second journey of exploration the party started about the middle of January. —On April 26th reinforcements left Liverpool for the Congo, among them being Mr. A. Sims, M.B., who hopes to be able to open the first medical mission at Stanley Pool in the autumn, and Mr. William Appel, who has for some time been studying under the Society's Instructor in practical astronomy with a view to the prosecution of geographical work in Central Africa.

Rio Purús.—In a letter written from São Pedro de Caxoeira at the end of last year, the Rev. W. T. Duke mentions having towed Dr. Melrose, an American, up to the Panyny affluent, and when returning he endeavoured to reach some of the Indians near the banks of the Purús by travelling through the forest on foot, none of the small affluents being then navigable. Mr. Duke first made for the neighbourhood of the sources of the Ciriwéné, and after an hour's walk came upon the huts of some of the Hypurinas engaged in cutting indiarubber; and notwithstanding the rumoured hostility of the natives near the head-waters, still proceeded onwards, their guide showing no fear till the third day. He then told Mr. Duke that they were within a short distance of their proposed destination, but that he himself would not go any further. As the remainder of his party consisted of mere boys, Mr. Duke again found himself compelled to abandon a favourable opportunity for reaching the Indians. The next place he visited was Inaçape, a lake a little lower down, where he spent some little time, and then returned to São Pedro. On his way back Dr. Melrose reported having been a considerable distance up the Panyny affluent, and gave good accounts of the Indians along its banks; there were not many Hypurinas, but he saw numbers of Jamamadys and Cataguinas. Mr. Duke says he is about to accompany Dr. Melrose on a journey, of which he hopes shortly to send interesting news.—During his last trip, Mr. Duke had an opportunity of observing the *impromptu* hammock constructed by the Hypurina when travelling, which he thus describes:—He strips a piece of bark from a tree, about 4 inches wide and 6 or 8 feet long, tying a knot at each end, to which he attaches the cords (also of bark). He then splits the piece of bark into four or five strips, so that it will open out somewhat in the shape of a hammock, which, of course, has to be used with skill and care, or the sleeper will often fall through.

ON THE INSTRUCTION AT PRESENT SUPPLIED IN THIS COUNTRY, IN PRACTICAL ASTRONOMY, NAVIGATION, ROUTE SURVEYING, AND MAPPING.

The following paper on the above subject has been drawn up, and submitted for the consideration of the Council of the Royal Geographical Society, by Mr. Clements R. Markham.

THE measure adopted by the Council in 1879, for the instruction of travellers, has been successful.* The means have been provided, by the Society, through which intending travellers can receive instruction in practical astronomy, route surveying, and mapping; and such training is annually given to several students, engaged in various pursuits, who are about to visit distant, and sometimes unknown parts of the world. From 1879 to the end of 1881, 532 lessons have been given to 42 students. The practical results of this measure are now beginning to appear, and they prove that the course adopted by the Council already is, and is likely in increasing measure to be useful in advancing the objects of our Society.

But the instruction thus afforded can only be taken advantage of by a small fraction of those whose occupations take them to distant and little known regions, and who, if they had the needful training, might do good service to geography. It is desirable that all such travellers and settlers should have had similar advantages, and this end can be secured by the promotion of geographical education in trade schools and other institutions, and by encouraging the acquisition of the needful knowledge among boys and young men before they enter upon their professions or callings. If it was a general practice to teach applied mathematics and practical astronomy in schools, such knowledge would be instructive and useful to all, while a certain number would find it to be a great advantage and would, through the training thus received, do good service, in after life, to geographical science.

It has occurred to me that the Council may think it desirable to consider whether any action can usefully be taken by the Society, with a view to promoting an end which, if it could be even partly attained, would be conducive to the interests of geography. In order to secure full consideration of a question which I believe to be important, I have taken some pains to bring together such information as will enable the Council to form an opinion as to whether or not it would be advisable for our Society to move in the matter. At least it seems right that the actual condition of things in this country, as regards education in those branches of knowledge which are necessary for a practical geographer, should be submitted to the Council.

It is certain that the nations which, during the last four centuries, have taken part in discovery and geographical research, have all been impressed with the necessity for instructing their explorers by land and sea in all such knowledge as would best enable them to perform the service entrusted to them with efficiency. The Spaniards, Portuguese, French, Dutch, and our own ancestors felt that their ships would not be safe on long voyages, that their travellers and maritime adventurers would make their journeys and voyages without bringing back useful results, unless instruction was provided in all the knowledge that could be of

* Proposed by Mr. Clements Markham, seconded by Mr. George Brodrick: "That it is desirable that the Council should organise a plan for the instruction of geographical students and others about to visit unknown or little known countries, so as to train them as scientific observers: and that a Committee be appointed to consider and report upon the details of such a plan."

service to them. It was found that in proportion as attention was given to the training and instructing of sailors and travellers by land, voyages and adventures were more profitable, and discoveries were more successful and important.

Spain's maritime greatness could, in the opinion of her rulers, be maintained only by keeping up the standard of knowledge among her sailors and explorers. With this object the office of Cosmographer was established in the Council of the Indies, whose duties were not only to superintend the preparation of charts and sailing directions, and to advise the Council in matters relating to his work, but also to teach the subjects of the King of Spain. He and his assistants were ordered to deliver a course of instruction which was to extend over three years.* Thus the Spanish candidates all went through a three years' course of study, in the days of Spain's greatness, before they were considered to be qualified for any responsible post.

When our country began to take a lead in discovery and maritime adventure, more than three centuries ago, the importance of securing suitable instruction for all who were engaged on such service, was at once felt. Richard Hakluyt, the father of English geography, in the dedication to his 'Principal Navigations,' eloquently advocated the careful training and instructing of sailors and explorers. In October, 1598, he pointed out how needful it was that, "by way of lectures or such like instruction," seamen should receive a better education than had hitherto been the case. He referred to the course of lectures for Spanish students, established by Charles V. at Seville; and mentioned the Guilds or Brotherhoods (called Trinity Houses) which Henry VIII. erected at Deptford, Hull, and Newcastle-on-Tyne, for the increase of knowledge among his seamen.

Owing mainly to the stimulating appeals of Hakluyt, public lectures in navigation and nautical astronomy were established, and supplemented by private instruction. Dr. Thomas Hood delivered lectures in the house of Sir Thomas Smith, in Gracechurch Street, and Edward Wright was lecturer on navigation for the newly founded East India Company. We are also told by Mr. Howes, in his continuation of Stowe's 'Annals,' that a lecture in geography, hydrography, and navigation was read in the Chapel of Leadenhall. All this was in the time of Queen Elizabeth. Similar arrangements were continued in the subsequent reign, when there were navigation and geographical lectures given in the house of Adrianus Marius, in Blackfriars. Edmund Gunter, the inventor of the scale, also gave instruction at Gresham College; and some arrangements were set on foot by the Trinity House at Deptford, for training officers and pilots.

The bane of this country has always been a want of continuity of purpose in official undertakings. It would appear that, before the middle of the seventeenth century, the navigation lectures had fallen into disuse; for Sir William Monson, writing in 1641, made a renewed appeal for the establishment of a lecture on navigation. Seamen had books, it was true, but the old admiral urged that books were not enough, and that verbal instruction was also necessary. He said that it had been questioned whether a man can attain to better knowledge by experience or by learning; but he very truly added that the man who has experience joined with learning, becomes most excellent in the art he professes. What, he exclaims,

* *First Year.*—Four rules of arithmetic, rule of three, extraction of square and cube roots, fractions, the "*Sphæra Mundi*" of Sacrobosco, Purbach's theory of the planets, and the Alphonsine Tables.

Second Year.—First six books of Euclid, arcs and chords, right sines, tangents, and secants, spherical triangles of Regiomontanus, and Ptolemy's *Almagest*.

Third Year.—Cosmography and navigation, use of the astrolabe, methods of observing the heavenly bodies and their movements, use of the globes, construction and use of various mathematical and astronomical instruments.

made Abraham Kendall and John Davis so famous for navigation but their learning which was confirmed by experience?

A quarter of a century after Sir William Monson wrote, Mr. Samuel Pepys was installed at the Admiralty, and a navigation school was founded. Charles II., in 1673, established a mathematical class to be held within Christ's Hospital by a master skilled in mathematics and navigation, and to consist of forty boys to be taken out of the boys of the Hospital. This was the first navigation school. At the age of sixteen such boys as, in the judgment of the Master of the Trinity House, were sufficiently instructed in the art of navigation to be fit to enter on its practice, were to be apprenticed to captains of ships. These apprentices received an outfit, and every year ten of them were provided with nineteen shillings a month for the first three years of their apprenticeship. The numbers of this navigation school, down to the present year, have been kept up to fifty or sixty boys. Ten leave every year, some entering the navy and others the merchant service. If they stay until the age of sixteen these boys are able to pass the same examination as that for lieutenants in the navy. At present each boy placed out to sea service receives 25*l.* the first year, and 24*l.* 14*s.* for the two following years, after having passed a satisfactory examination in his nautical attainments, before the Head Mathematical Master. A small outfit is also provided.

Thus the nautical school of Christ's Hospital has a continuous history extending over two centuries. From 1700 to 1750 as many as 128 of its boys entered the navy; from 1751 to 1800 the number was 105; from 1800 to 1850 there were 60; and from 1851 to 1877 there were 55. Admiral Bedford, the late Marine Adviser of the Board of Trade, was one of them. Admiral Spratt, the accomplished Surveyor and now Conservator of the Mersey, is another. Commander Hull, R.N., the Arctic navigator and surveyor, who so long and so ably superintended the chart department of the Hydrographic Office at the Admiralty, also received his training at the Christ's Hospital nautical school. So did another living surveyor of eminence, Lieut. L. Dawson, R.N., who now commands the *Investigator*, a steamer belonging to the Indian Marine Survey Department.

Forty years after the establishment of a mathematical school at Christ's Hospital, similar instruction began to be provided at Greenwich, under the following circumstances.

When King William and Queen Mary granted King Charles's palace at Greenwich, and the grounds belonging thereto, as a hospital for the use of seamen, on the 25th of October, 1694, the objects, as stated in the Letters Patent, also included the maintenance and education of the children of seamen slain or disabled in sea service, and the improvement of navigation. There is no record to show that the wishes of the Royal Founders were attended to as far as the education of children was concerned until the year 1712, when a school was established for the children of pensioners and nurses. From the first, navigation was part of the course. In 1719 the privilege of admission was extended to all seamen, and a substantial addition to the funds was provided. The surplus annual income was invested, and as the funds increased the number of boys was raised to 60 in 1730, to 150 in 1790, and to 200 in 1803. It appears that, in those days, little was done for their improvement, but in 1821 the late Mr. Edward Riddle, who had for some years been Master of the Trinity House School at Newcastle-upon-Tyne, was appointed Master of the Mathematical School of the Royal Hospital at Greenwich. Mr. Riddle had for many years given great attention to the teaching of navigation and nautical astronomy, and was one of the first to teach those subjects on a scientific basis. He published a work on this branch of knowledge, which was an immense improvement on the empirical compendiums then in vogue, as it combined theory and practice in due proportion.

Under Mr. Riddle the nature of the school soon changed, and the education so improved that it became an object of desire of children of parents in a higher social position than was intended by the Royal Founders.

At this time, in 1821, the Royal Naval Asylum, which had been founded at Paddington and supported partly by private subscription and partly by a parliamentary grant, was incorporated with the Greenwich Hospital School, and called the Lower School, consisting of 200 girls and 680 boys. The old Greenwich Hospital School was then called the Upper School, but there was no increase in its numbers until 1828. In that year the two schools were equalised, the number being 400 in each. The increase in the Upper School consisted of sons of officers, and boys of marked ability were also promoted from the Lower School. In 1829 the number of sons of officers was reduced to 100, but as the other 300 were nominated by private patronage, many of these nominees were also sons of officers of the navy, marines, and mercantile marine.

Notwithstanding the great difficulties with which Mr. E. Riddle had to contend, he succeeded in so imbuing the pupils with his own zeal and energy, that the school became noted as by far the first navigation school in the country. There were three points to which Mr. Riddle specially turned his attention, namely, the theoretical proof of every rule, chart drawing, and observing. As an observer he was unsurpassed, and many an old pupil remembers him coming to the dormitories at all hours of the night, with the call "my first class," when anything of particular interest was to be observed. With this training, many boys who entered the navy as Master's Assistants, were perfect masters of the subjects of navigation and nautical astronomy, and not a few have become distinguished in their profession. It would be invidious to single out a few names, when there are so many of equal merit; but I cannot refrain from mentioning two distinguished officers with whom I served in the Arctic Regions, Captain Robert C. Allen, c.b., and Mr. G. F. McDougall, the accomplished surveyor and artist, and author of 'The Voyage of the *Resolute*.' All the officers of the Hydrographic Department of the Admiralty, with two exceptions, were educated at Greenwich School.

The Upper School was divided in 1841, and the senior portion, which was called the Nautical School, was entrusted to Mr. Riddle; and in 1845 the small staff of masters was very much increased. Mr. E. Riddle was succeeded, in 1851, by his son, Mr. John Riddle, who possessed the same power of imparting knowledge to his pupils as his father had. The influence he possessed over them was unbounded, and he will long be remembered for the large number of accomplished teachers of navigation who were trained under him. Among them may be mentioned:—

Mr. Albert Escott, Head Master of Greenwich Hospital School and Editor of 'Riddle's Navigation.'

Mr. J. W. Lawless, Naval Instructor to the Royal Princes, H.M.S. *Bacchante*.

Mr. T. S. Oborn, Instructor in Navigation at the Royal Naval College.

Mr. W. T. Littlejohns, Naval Instructor, Royal Naval College.

Mr. G. Williams, Naval Instructor, H.M.S. *Britannia*.

Mr. Zebedee Scaping, Head Master, Trinity House School, Hull.

Mr. C. Barton, Head Master of the *Conway* Training Ship, Liverpool.

Mr. Light, Second Master of the *Conway*.

Mr. A. J. Gayne, Science Master, Market House, Gosport.

Mr. J. R. Jones, Master of the Navigation School, Aberdeen.

Mr. J. Newton, Teacher of Navigation in London.

Mr. W. H. Bolt, Teacher of Navigation in London.

Mr. W. H. Thorn, Teacher of Navigation, North Shields.

Mr. Allen, Master of the Navigation School, Dundee.

Chart drawing continued to be most successfully taught, and a large proportion of the officers employed in the surveying service of the navy was educated at Greenwich.

The Admiralty abolished the Upper School at Greenwich in 1860, and this measure was followed up, by withdrawing the sixteen nominations for Master's Assistantships which had been given annually. Navigation continued to be taught in the Lower, now the only School, but as the best outlet for the boys was that of Engineer Studentships, more attention was directed to mechanics and kindred subjects than to navigation. The latter subject, however, still continues to receive much attention from pupil teachers, many of whom, under the able tuition of Mr. Escott, the present Head Master, have distinguished themselves at the examinations of the Science and Art Department, as will be more particularly noticed immediately.

The navigation schools at Christ's Hospital and Greenwich are particularly interesting because they were founded in those early days when the great importance of a thorough training was fully appreciated and, alone among the kindred institutions of those times, they have continued to exist. But the abolition of the Upper School at Greenwich in 1860 was a crushing blow to geographical education, the ill-effects of which are still felt.

The Fraternity of the Blessed Trinity at Newcastle-on-Tyne existed as a religious and secular guild of mariners, as early certainly as 1492. It received a new charter from Henry VIII. in October, 1536, the main object of which was to encourage the art of navigation, and on May 9th, 1712, the master pilots and seamen of the Newcastle Trinity House established a free school for the instruction of children of the brethren in mathematics. This navigation school long continued to flourish, and from 1814 to 1821 it was presided over by so distinguished an instructor as Mr. Edward Riddle. The Newcastle colliers were laid up during the winter months, and the apprentices then received instruction in navigation and nautical astronomy. Mr. Riddle was succeeded by Mr. Thomas Gray, who well maintained the reputation of the school. When the sea apprenticeships were abolished, the school was continued for some time, but few took advantage of the opportunities it offered. In the end of 1870 it was abolished. Mr. W. H. Thorn was the last head master. Many of the old shipmasters on Tyne-side have pleasing recollections of the hours spent within its old walls, and deeply regret that it was closed. This was another retrograde movement, and is much to be deplored.

In the last century a navigation class was opened by the Guild of Merchant Venturers at Bristol, in 1738, which no longer exists; and a school was founded by the Corporation of the Hull Trinity House in 1785.

The conclusion to be drawn from this brief review of what was done for the instruction of English sailors and explorers in old times, is, I think, sufficiently evident. Throughout the period when England attained her highest renown as a nation of intrepid discoverers, the period of Cabot and Willoughby, of Frobisher and Hudson, of Drake and Cavendish, of Davis and Baffin, of Dampier and Cook, importance was attached to a system of training and instruction. Numerous books on navigation were published, lectures were instituted, and pains were taken to furnish sailors and explorers with a thorough grounding in the art of laying down routes, mapping, and fixing positions.

Such was the policy of our ancestors. The results are recorded in history. This system formed a succession of generations of men who thoroughly understood the scientific branch of their work. The experience of many of them led to valuable inventions and improvements in the art of navigation. To their skill and knowledge, based on early training, are due the memorable voyages and discoveries of which

their descendants are justly proud. Thus we have cause and effect. On the one hand the lectures at Leadenhall and in Sir Thomas Smith's house; on the other the voyages round the world, and the first successful ventures of the East India Company. That system of grounding and instruction which our ancestors, like the Spaniards before them, believed to be so necessary, was one source of our maritime greatness and commercial wealth. Such at least was the opinion of our ancestors; and if we glance at the systems in force in neighbouring countries, we shall find that the same opinion is still held abroad, although it has ceased to influence many of those whom it most concerns in our own country.

In France every seaman and fisherman has served for three years in the navy and has received a thorough training. Liberal and effective means of education are also provided on shore, for the seafaring classes. An Instructor paid by the Government, resides in each of the principal ports and affords instruction, free of charge, to all seamen who desire to qualify as officers.

In Germany there are large navigation schools at Hamburg and Bremen. In Holland there is one at Amsterdam, which was founded in 1780, where 50 boys are clothed, fed, and boarded for 10*l.* a year each; and ten other navigation schools at different ports, where 440 students receive instruction. When we consider that the population of Holland is 4,000,000, and of Great Britain 30,000,000, some idea of the difference between the two countries, in their appreciation of the importance of supplying instruction to their sailors and explorers, may be formed. For there is only one such school in Great Britain. Belgium has only two important seaports, Antwerp and Ostend, but at both there are large and carefully regulated navigation schools with gratuitous instruction. In Denmark there are five navigation schools to a population of under 2,000,000. Each school receives about 170*l.* a year to provide instruments, books, and apparatus useful for teaching. The examinations are held at the schools themselves, and the boys receive gratuities when they pass the examinations. There is a similar system in Sweden and Norway; and in Sweden an attendance of at least six months at a navigation school is required, before a man can obtain a certificate as either master or mate. But there are no school fees or expenses, as the instructors are paid by the Government. In Italy there are navigation schools at Venice, Genoa, and Naples.

Even in the little province of Biscay in Spain, the Basques have established no less than four navigation schools along its coasts, at the small towns of Lequeitio, Bermeo, Plencia, and Santurce. The first and last were founded and endowed through the liberality of wealthy individuals, but the two others were set on foot by the towns themselves. The nautical school at Santurce, was founded in 1861 by H. E. Don Cristobal de Murrieta. All the boys of the towns of Santurce, Portugalete, and Sopuerta, have the right to attend free of charge, and the necessary books are supplied to them gratis. The course extends over three years. The first is devoted to arithmetic, algebra, geometry, and drawing. In the second trigonometry is also taught: in the third cosmography, physics, and navigation. As soon as the course of studies is finished, the boys, having been publicly examined each year, must make two voyages in a sailing vessel to the Havana, or one to Manilla, and then pass an examination which qualifies them as navigators of the third class. After another voyage they pass a second examination qualifying them to be mates. There are, on an average, 30 scholars at Santurce, and altogether 600 have passed through the school since its foundation, provided with all the knowledge necessary for a navigator. It struck me, in visiting Santurce last August, that, considering their means, and the size of their little province with a population under 200,000 souls, these Basques were doing more than this great and rich country of ours, and that they were setting an example which we should do well to follow.

In Great Britain alone is the training of those whose avocations take them to distant regions by land or sea, comparatively neglected; such institutions as the Upper School at Greenwich, the Trinity House School at Newcastle, the navigation class of the Merchant Venturers at Bristol, and others having actually been abolished. Yet of all people in the world, the English need such knowledge most.* If we take a survey of the provision which now exists in this country for the education required by a practical geographer, it will be seen that much improvement is needed.

Previous to 1850 there were voluntary examinations, which were set on foot by the Board of Trade, and officers in the merchant service were invited to pass them. They were of a much higher character than the compulsory examinations which were afterwards introduced. In 1854 Mr. Cardwell consolidated and amended all the Acts relating to merchant shipping, and the new Act, as well as a former one of 1850, provided that examinations should be made compulsory, to enable masters and mates to obtain certificates of competency. The Board of Trade laid down rules as to the conduct of the examinations, which were commenced in January 1851. At first it appears to have been felt that something more was needed, and that examinations alone would not supply the necessary training. For an experiment was tried with a view to establishing navigation schools in the principal seaports. Men were invited to qualify as masters, were examined for competency, and received certificates carrying with them a certain annual payment in addition to salary. The cost of these schools was paid partly out of the mercantile marine fund, and partly out of the educational grant. In 1854 the schools were transferred from the control of the Board of Trade to the Science and Art Department; but in 1864 the experiment was abandoned. All the schools came to an end (except that at Hull, which was an old foundation), or were only continued as places for "coaching" men for the Board of Trade examinations.

These examinations † are conducted under the Board of Trade, by local examiners at the following ports:—

England.	Scotland.	Ireland.
London.	Leith.	Belfast.
Bristol.	Glasgow.	Dublin and Cork.
Hull.	Dundee.	
Liverpool.	Aberdeen.	
Plymouth.		
S. Shields.		
Southampton.		
Sunderland.		
Swansea.		

The qualifications have been kept as low as possible; but it was the intention of

* "We ought to direct our attention more earnestly than we have yet done to the education of our seamen. If education is necessary on shore, it is still more so with seamen, and yet we have done practically nothing as a nation, to assist them in gaining knowledge, and especially that description of knowledge required in their calling. We have not seriously attempted any practical scheme for their education."—Lindsay's *History of Merchant Shipping*, iii. p. 541.

† *Second Mate*.—Definitions of terms used in navigation, arithmetic, use of logarithms, day's work including correction of courses for variation, deviation, and leeway, latitude by meridian altitude of the sun, difference of longitude from a given departure by parallel sailing, course and distance by Mercator's method, time of high water at a given port, amplitude of the sun and find error of compass therefrom, daily rate of chronometer

the Board of Trade (as stated in the Circular of 1850)* to raise the standard. This, however, has not yet been done, although new questions have been added to the examination papers from time to time. Consequently the examinations do not require from the candidates real knowledge of nautical astronomy and of the problems on which it is based. Hence the establishments for preparing candidates for these examinations need only be briefly noticed. The cause of geographical education cannot be furthered by them until the system is altered.

In London, Mr. Rosser is a competent instructor who prepares for the examinations. He is the author of several books on navigation and nautical astronomy, and has been engaged in teaching since 1851. Two of the masters, both educated at Greenwich, who were the first to take schools under the Board of Trade, continued to teach on their own account, in London, when that Department gave up the educational experiment. These are Mr. Newton at the Sailors' Home in Wells Street, and Mr. Bolt on Tower Hill. Mr. Maxwell also holds a school in one of Mr. Potter's chart warehouses in King Street, Tower Hill, and Mr. Martin at Norie's establishment in the Minorics. Mrs. Janet Taylor gave lessons at her house in the Minorics for many years, and was the author of lunar tables, and of a very good treatise on navigation. It was in her establishment that Mr. Rosser commenced his career as an instructor in nautical astronomy. At Bristol there are two instructors who have night schools. At Liverpool there is a class at the Sailors' Home conducted by Mr. Gill, a very efficient teacher; † and another is kept by Messrs. Le Conteur and Moore. At Hull candidates are prepared at the Navigation School, and at Plymouth by Mr. Merrifield, whose excellent establishment will be noticed presently from another point of view. At South Shields there is the Winterbottom Nautical School, of which Mr. T. Dobson, M.A., is head master. It is endowed, and any one who has been one year at sea can receive gratuitous instruction there. Another navigation school at South Shields is kept by Mr. T. Ainsley, author of a 'Guide Book to the Local Marine Board Examination' (1st ed. 1856, 24th ed. 1871); and a third by Mr. Duncan, a retired shipmaster. At North Shields Mr. Thorn, who was the last Head Master of the Trinity House School at Newcastle, is ready and pleased to instruct lads going to sea, and apprentices, but he does not get many: his time being fully taken up with adults. At Sunderland there is a

from error observed, longitude from altitude of the sun, use and adjustments of the sextant, find index error and read off and on the arc.

First Mate.—In addition to the above, variation by azimuth, finding index error and true bearing by the sun, latitude by single altitude of sun off the meridian, ship's position by Sumner's method, by projection, use of the chart.

Master.—In addition to the above, latitude by meridian altitude of a star, magnetic bearing from equidistant compass bearings of any fixed object when at sea and compute deviation therefrom, construct a deviation curve on a "Napier's diagram," find course to steer by compass to counteract effect of a given current, correction to apply to soundings taken at a given time and place to compare with depth marked on chart.

Extra.—Lunar by sun, star, or planet, and compute altitudes, latitude by meridian altitude of moon and Pole Star, double altitude, use of artificial horizon, construction of sextant and of the vernier, great circle sailing, law of storms.

* "The qualifications have been kept as low as possible; but it must be distinctly understood that it is the intention of the Board of Trade to raise the standard from time to time, whenever, as no doubt will be the case, the general attainments of officers in the merchant service shall render it possible to do so without inconvenience."—*Board of Trade Circular*, 1850.

† This class was one of those which were formed at the instance of the Board of Trade in 1853. But since the educational experiment of the Board was abandoned, the class has been carried on by Mr. Gill, entirely on his own responsibility.

nautical school under Captain W. G. Bergen, the author of an 'Epitome of Navigation,' 'Practice of Navigation and Nautical Astronomy' (4th ed. 1876), 'Great Circle Charts,' 'Ocean Routes,' and 'Winds in the Atlantic.'

At Leith there is a Navigation School managed by the Provost and Senior Bailie of the Burgh, the Master of the Trinity House, the Chairman of the Chamber of Commerce, and representatives of leading Commercial Houses. Books and instruments are supplied free of charge, and there are about 150 pupils. There is also a Leith Nautical Academy, with evening science classes, kept by Mr. John Lockie. There is a navigation school at Dundee, where seamen are prepared for the examinations, and another at Aberdeen, conducted by Mr. J. R. Jones. At Glasgow there are three instructors, and at Greenock one. There is a good and well-qualified instructor at Belfast, Mr. Larmour, who prepares men for the examinations. At Dublin there is a shipmaster who teaches at the Sailors' Home; and something of the same sort at Cork, where a school is kept by a lady who knows the theory of navigation, but not the use of a sextant.

The Board of Trade examinations, owing to the standard not having yet been raised, have unfortunately not had so satisfactory an effect in encouraging education as was doubtless intended when the details were arranged. The candidates rarely care to know more than will barely suffice to pull them through the examinations, and the knowledge thus acquired (slight to begin with) is extremely evanescent—so much so that, in many instances, a week after a candidate has passed he could not again successfully undergo the same ordeal. I read also, in a recent very useful work* by an eminent Commander of the Mercantile Marine, that many young men have absolutely no groundwork of education, and pass the examinations merely by dint of hard cramming. This being the case, the existing Board of Trade examinations seem to call for revision. The *necessary* qualification for command of coasting and small vessels, should not perhaps be raised; but for higher positions there should be a change in the direction of requiring a real knowledge of the subjects. The examinations should not consist of more questions, nor be more difficult for those who have been properly trained, but more thorough. They should embrace the theory as well as the practice of every subject. Another change might be useful. At present a candidate must produce absolutely correct results (within one minute of position), and to this there can be no objection. But nothing counts for intelligent knowledge nor for the manner of solution. A system of marks should be introduced in which accurate results should of course obtain the largest share. But credit should also be given for intelligent knowledge of principles.

It would undoubtedly be a great gain to geographical science if the officers of our Mercantile Marine were thoroughly grounded in the theory as well as in the practice of nautical astronomy and kindred subjects. Such an alteration in the Board of Trade examinations as would make it necessary for every candidate to have received a thoroughly efficient education, would secure this end. For it would necessitate the establishment of numerous navigation schools, and this would doubtless lead to the extension of such instruction not only to seamen, but to all whose occupations are likely to take them to distant countries. It was, as has already been noticed, the intention of the Board of Trade, when the examinations were commenced in 1850, to raise the standard from time to time. The adoption of this much-needed measure should now be urged upon the attention of the authorities.

Meanwhile a useful stimulus has been given to the study of nautical astronomy during the last eighteen years, by the examinations of the Science and Art Depart-

* 'Wrinkles in Practical Navigation,' by Captain Lecky.

ment at South Kensington. The scheme includes payments to teachers on results and prizes to students after examinations. From 1864 to 1868 the number of candidates that went up for navigation was 683, of whom 580 passed; and 398 went up for nautical astronomy, of whom 326 passed. Since 1868 the examinations, for each subject, have been divided into *honours*, *advanced stage*, and *preliminary stage*. From 1869 to 1881 the average number of candidates for the navigation examination has been 290. In 1881 there were 338. Of the whole number that went up from 1869 to 1881 (3079), there were 59 who went up for honours, of whom 33 passed; 999 for the advanced stage, of whom 862 passed, and 2021 for the elementary stage, of whom 1598 passed.

In nautical astronomy the average number of candidates from 1869 to 1881 was 80. In 1881 there were 66. Of the whole number (904), 17 went up for honours and 12 passed, 250 for the advanced stage, of whom 172 passed, and 637 for the elementary, of whom 578 passed.

These examinations are conducted by means of printed papers of questions sent to the candidates, so that proficiency in the use and manipulation of instruments is not ascertained. But the questions are calculated to test a thorough knowledge of the subjects. The South Kensington Reports give information respecting the schools where navigation and nautical astronomy are taught, as well as the results of the examinations. It appears that a considerable number of schools in different towns of Great Britain, and even in Ireland, have classes for navigation. This is especially the case at Plymouth, Stonehouse, and Devonport, where traditions of the heroic days of Hawkins and Drake still linger, and at Falmouth and Swansea. But the instruction does not extend to nautical astronomy, so that it cannot be regarded as complete or satisfactory.*

* The following is a specimen of the Kensington examinations in navigation:—

First Stage (Elementary)—

Section I. Relating to a day's work.

1. Define latitude, longitude, and departure.
Given latitude from, and true difference of latitude, find latitude in.
Find the middle latitude of the same two places.
What is the difference of longitude between two places—longitudes given?
2. Define a course. Questions relating to the compass.
3. Define distance. Describe the patent log.
When is nautical distance the shortest distance between two places?
4. What is traverse sailing? Describe construction and use of traverse tables.
5. Explain starboard and port tacks, close hauled, windward, leeward. Define leeway. Under what circumstances is leeway greatest, under what is there no leeway?
6. Prove the following formulæ:—

$$\text{Dep.} = \text{Dist.} \times \sin \text{course.}$$

$$\text{Diff. Lat.} = \text{Dist.} \times \cos \text{course.}$$

$$\text{Dep.} = \text{Diff. Lat.} \times \tan \text{course.}$$

Section II.

7. Lats. and longs. given, find course and distance from one place to another.
8. After sailing a given distance due E. from given lat. and long., find long.
9. After going a given distance and course from given lat. and long., find lat. and long. in.
10. A ship off a point where variation and deviation given, with ship's head N.E. and S.W. True bearing of ship from point given find compass

From the last South Kensington Report, it appears that there are only six schools in England which give instruction in navigation and nautical astronomy, and enter candidates for the examinations of the Science and Art Department. These are:—

1881.

1. The Greenwich Hospital School	4 Candidates	3 passed.
2. The Hull Navigation School	38 "	28 "
3. The Plymouth Navigation School	1 "	1 "
4. Gosport Market House	6 "	6 "
5. Yarmouth School of Art, &c.	3 "	3 "
6. Manchester Grammar School (Long Millgate)	3 "	3 "
	<hr/> 55	<hr/> 44

1. The class in the selected division of the Greenwich Hospital School consists of 50 boys learning navigation, while a more extended course in navigation and nautical astronomy is given to twelve senior pupil teachers. The honours lists of the South Kensington examinations show that the teaching of these subjects at Greenwich by Mr. Escott, the head master, has been very successful. Greenwich may hereafter be an admirable source of supply for efficient teachers. At present the best instructors on board the *Worcester* and *Conway* are from Greenwich; and several are engaged in preparing for the Board of Trade examinations, in which

bearings of land when ship arrives on a N.E. course, and when she departs on S.W. course.

11. Lat. and long. variation and deviation given; find course and distance between two places.
12. From a given place a ship sails on five courses and distances, required course and distance made good, and lat. and long. in.

Second Stage (Advanced).—

1. What is middle latitude sailing? Write down characteristic formulæ. Prove the formula— $\text{Diff. lat.} = \text{Diff. long.} \times \cos \text{lat.}$
2. Describe table of deviation of compass used on board ship.
3. Describe the log line and glass.
4. Explain the method practically used in great circle sailing.
5. A cutter distant from a ship 7' S.S.W., wind S. by E., and cutter lies within 6 points of it. How far must she sail on the starboard tack to reach the ship on the other tack?
6. Two vessels at one place sail together for another, at same time. One sails due W. to longitude of place, and then due N. The other due N. to latitude of place, and then due W. Which will arrive first? and how many miles will she have the advantage?
7. By Mercator sailing, find compass course and distance between two places, variation and deviation given.
8. Given a log for 24 hours, with departure. Find lat. and long. in.

Honours.—

1. Explain difference between middle latitude and Mercator sailing.
2. Compensation and correction of compasses.
3. Construct a traverse table.
4. Marine survey. Describe methods of determining second principal station.
5. Circular storms, Cyclones.
6. Initial course for sailing on a great circle between two given points.
7. Construct a Mercator's chart, given scale and limits. Lay down lat. and long. in. of a ship, and true course; given departure and variation.

work their knowledge and excellent training will make them still more useful when the standard of the examinations is raised.

2. At Hull there has been a navigation school in connection with the Trinity House for many years. It was established in 1785, and was reorganised under the direction of Dr. Lyon Playfair in 1855. The school was founded with two objects—to supply a practical education for boys intended for sea service, and to increase the knowledge of adults. Mr. Scaping, the head master, is an excellent instructor, who received his education from Mr. Riddle at Greenwich. From 150 to 160 boys are at the school, most of them sons of poor seamen, orphans being preferred, who are clothed at the cost of the Corporation, and expressly educated for sea service. Boys, whose parents can afford to pay for education, are admitted on payment of fees; but at least a hundred are wholly exempt. When a boy leaves the school, which he generally does at the age of fifteen, he is made a member of a society of which the Corporation of the Hull Trinity House are treasurers, called the Trinity Provident Society, and his subscription is paid for him for seven years, on the understanding that he is then to take up the subscription for himself. The plan works very satisfactorily. The course of instruction embraces mathematics, navigation, nautical astronomy, magnetism of iron ships, use of instruments, chart drawing, and use of charts. The Hull boys have gained fifty of the Queen's Medals awarded by the Science and Art Department since 1865. This is practically the only school of the kind in England.

3. At Plymouth there is a private navigation school, conducted by Mr. Merrifield, one of the first teachers in England, and the author of works on navigation and nautical astronomy, magnetism and deviation of the compass, and on the meteorology and climate of Plymouth. His work on magnetism has been translated into German, for the use of the German navy. The Plymouth Navigation School was established in 1862 for preparing officers of the mercantile marine for their examinations. A flat roof was constructed on the top of the house, commanding the sea horizon from S. by E. to S.S.W., where pupils are taught to observe; and the school is well supplied with instruments and charts. The chronometers are rated by the aid of a small transit instrument erected on the premises, and there is also a meteorological observatory. The school is chiefly used by candidates for the Board of Trade examinations, but occasionally officers of the navy and army avail themselves of the advantages offered by it. Two evenings every week are devoted to classes, at which any one may attend, and where a course is given of mathematics, including plane and spherical trigonometry, the use of instruments, the methods of fixing the position of the school by observation, and an endeavour is made to give those who attend some knowledge of natural phenomena, teaching them to keep their eyes open to all that may occur. The average attendance at the day classes is about thirty, and the evening classes number about twenty, the former chiefly men preparing for examinations, but the latter consist of boys of fourteen and upwards. This is the best situated and best equipped navigation school in England.

4. At Gosport there is a School of Science and Art, commenced in 1873, which meets in the Market House. Mathematics, navigation, and nautical astronomy are taught at evening classes by Mr. A. J. Gayne. The number of students has fluctuated between three and fifteen, at ages from thirteen to nineteen. There has never been a failure in the elementary stage of the examination held by the Department of Science and Art; one or two failures in the advanced stage, and no failure in honours. There were three in the honours class in 1879, one in 1877, one in 1874. G. Goodwin, a boy who was sent up in 1877, at the age of fourteen, was the first of all students in the kingdom who were examined for navigation, and he obtained the

same position in 1879 for nautical astronomy. Few mercantile seamen join the classes, because "rule of thumb" methods are entirely ignored. This season of 1881 there are more students in nautical astronomy at the Gosport Market House than there ever has been since the formation of the classes.

5. At the School of Science and Art on the South Quay at Yarmouth, navigation and nautical astronomy are taught. This school was established in 1857, but in 1862 the system of annual payments on certificates was abolished, and several navigation schools were closed. In 1865, Mr. Stockton took charge of the Yarmouth school, and between that time and 1870 the number of successful candidates at the Board of Trade examinations was 79. In the same period 18 were successful in nautical astronomy, and 82 in navigation, at South Kensington. During the last ten years 63 candidates have passed the Board of Trade examinations; and there have been 79 candidates for the South Kensington examinations, of whom 35 passed in nautical astronomy. In 1881 six passed for navigation, and three for nautical astronomy. This year there will be 20 candidates for navigation and only one for nautical astronomy. There has been a growing decrease in the number of officers and seamen attending the school, owing to a decrease in the number of boys and young men entering the mercantile marine at Yarmouth for foreign trade. There is a winter evening class for boys studying navigation, numbering about twenty; but there has not been a single adult seaman, from Yarmouth, who has become a candidate in the South Kensington examinations.

6. At the Science and Art Grammar School in Long Millgate, Manchester, navigation and nautical astronomy form part of the work of the highest mathematical form. These subjects are studied from the interest taken in them, and not with any intention of entering upon a sea life; so that here we have an instance of such a system as geographers would desire to encourage. Every year some boys go up for the South Kensington examination, and in 1881 three candidates passed.

The general result, as derived from the South Kensington Reports, is that, during the year 1881 the number of lads who received an efficient education in nautical astronomy in England (exclusive of Hull) was sixteen, in Scotland two, in Ireland four—at Hull 28. The examination, at South Kensington, in nautical astronomy, seems to be well calculated to test real knowledge and to discourage cramming; the only drawback being that no part of it is *viva voce*, and that the manipulation of instruments cannot be included.*

* The following is a specimen of the South Kensington examinations in Nautical Astronomy:—

First Stage (Elementary):—

1. Definitions. Celestial equator. Ecliptic. Azimuth and amplitude of a body. Illustrate by diagrams.
2. Hour angle. Solar day. Apparent and mean time.
3. Use of sextant. Index error.
4. Difference of time in determining longitude.
5. Variation by alt-azimuth. Illustrate by diagram.
6. Parallax. Reason for the correction being always additive.
7. Latitude by observed meridian altitude of the sun.
8. Variation. Azimuth.
9. Longitude by chronometer.
10. Error and rate.

Second Stage (Advanced):—

1. Latitude by double altitude.
2. Formula for dip.

But there are two important institutions, besides Christ's Hospital, which do not appear in the South Kensington Reports. These are the private schools for preparing young gentlemen for apprenticeships in the mercantile marine, which have been established in the Mersey and in the Thames, on board the *Conway* and *Worcester*, with excellent results. The payments required are, however, beyond the means of the poorer classes. In 1859 the *Conway* was placed at the disposal of the Mercantile Marine Service Association of Liverpool, and a Committee of Management, composed of leading shipowners and merchants, and presided over by Mr. James Beazley, organised a school to educate boys intended for officers in the merchant navy, at a cost of fifty guineas a year to their parents. The *Conway* was soon found to be too small, and the *Nile* line-of-battle ship was substituted in 1876, still retaining the old name of *Conway*. The Board of Trade allows two years passed on board the *Conway* to count as one year's service at sea. The internal arrangements are excellent, and the scheme of instruction is well calculated to secure a thoroughly efficient training. The two prizes instituted by Her Majesty the Queen still further tend to this result. One consists of 35*l.* and an inscribed pair of binocular glasses to the boy who gains the naval cadetship. The other is a gold medal. From three to five cadets are selected by the Head Master as entitled to it so far as proficiency in their studies is concerned, and the medallist is elected from among them by the other boys. Several other prizes, for proficiency in different branches of study, have also been instituted; including one from the Meteorological Council for meteorology, and another for navigation and nautical astronomy. Since 1879 the Secretary of State for India has given annual appointments as leadsmen-apprentices in the Bengal Pilot Service.* Of the 160 *Conway* cadets, about 16 per cent. come from Liverpool and its neighbourhood. About 65 per cent. are sons of officers in the army and navy, and Indian services, professional men, and country gentlemen. The rest are sons of bankers and merchants.

3. Describe the tables of lunar distances in the 'Nautical Almanac.' What heavenly bodies are chosen, and why?
4. Sidereal time.
5. Latitude by observation of the Pole Star. Explain how it is that the Pole Star furnishes a convenient method for finding the latitude.
6. Longitude by chronometer, star.

Honours:—

1. In finding the latitude by altitude near the meridian when time is uncertain, show that the error in latitude produced by a small error in the hour angle will increase as the azimuth of the heavenly body increases.
2. Find the moon's right ascension from the occultation of a fixed star.
3. Tides.
4. From the longitude and latitude of the moon at a given time in the 'Nautical Almanac,' calculate the right ascension and declination.
5. Latitude by moon's meridian altitude.
6. Longitude by lunar observation.

* The Bengal Pilot Service consists of 70 members, of whom 12 are Branch Pilots, 45 are Master Pilots, and 13 Mate Pilots. In future there are to be 12 Branch Pilots, 40 Master Pilots, and 18 Mate Pilots. A Mate Pilot becomes a Master Pilot in about 5, and a Branch Pilot in 14½ years. They receive no salary, but 50 per cent. of the pilotage dues paid by vessels, which amount to about 45*l.* a month for Mate Pilots, 70*l.* for Master, and 90*l.* for Branch Pilots. Pilots receive pensions. Leadsmen-apprentices receive 10*l.* a month. They must be aged between 15 and 18. They serve two years as leadsmen, then pass an examination as Second Mates. They serve for one year as Second Mates in a pilot brig, and then go up for their examinations as Mate Pilots, receiving appointments when vacancies occur.

About 75 per cent. go to sea. From 1859 to 1881 1622 lads were received on board the *Conway*. It appears that 42 went into the navy, 10 into the Bengal pilot service, and 1168 as apprentices in the mercantile marine; of whom 68 are in the naval reserve; so that 400 did not go to sea. Captain Franklin, R.N., had charge of the *Conway* from 1870 to 1880; and he has been succeeded by Mr. Archibald T. Miller, a Navigating Lieutenant R.N. and commander of merchant vessels for many years. He takes the greatest interest in the efficiency of the institution, and in the future of the cadets. He has recently succeeded in getting one lad received as an officer in the merchant service, without serving the apprenticeship. The nautical astronomy tuition is conducted by Mr. Barton and Mr. Light, both old pupils of Mr. Riddle at Greenwich.

Following the example set by the *Conway*, the *Worcester* Nautical Training College was established by a Committee of shipowners and others to educate sons of gentlemen as properly qualified officers for merchant vessels: "for the purpose of remedying, in some degree, an acknowledged deficiency." The idea was originated by Sir George Chambers, who has ever since been Chairman of the Committee. The Admiralty placed the *Worcester* (and afterwards, in 1877, the *Frederick William* line-of-battle ship, retaining the old name) at the disposal of the Committee, and the school was opened for the reception of pupils on August 4th, 1862. The *Worcester* is moored off Greenwich and accommodates 200 cadets. There are 161 on board at present. The terms of admission are 55 and 60 guineas a year for lower and upper school respectively. Much encouragement has been given to this undertaking, and the results have been satisfactory. Her Majesty the Queen grants the same two prizes to the *Worcester* as to the *Conway*, namely, a gold medal, to be annually awarded to the cadet who shows the qualities likely to make the finest sailor; and a binocular glass, with 35*l.* towards his outfit, to the boy obtaining a naval cadetship. Appointments are also given to the *Worcester* cadets as leadsmen-apprentices in the Bengal Pilot Service. The Elder Brethren of the Trinity House and the Meteorological Council give prizes, and the Board of Trade allows two years passed on board the *Worcester* to count as one year's service at sea. The *Worcester* has been commanded, for the last fourteen years, by Captain I. Henderson Smith (Lieut. R.N.R.), and under his able management she has become, in all respects, a thoroughly efficient nautical training college. Several of the cadets have been received at once as officers without undergoing apprenticeships. The instruction in navigation and nautical astronomy under Mr. Buck, the head master, is excellent, and Mr. Escott, the Examiner, reported in 1881 that the results were very encouraging. Altogether, from 1862 to 1882, the number of cadets that have passed through the *Worcester* is 1500, of whom 93 have joined the Royal Naval Reserve, and 10 the Bengal Pilot Service. Over 90 per cent. have gone to sea. The Committee truly remark, in their Prospectus, that it is a fallacious idea that youths intended for mercantile marine officers should be sent to sea young. They add that to this unfortunate error the great scarcity of properly trained officers may be chiefly attributed.

These most useful institutions, in the Mersey and the Thames, will surely have the effect of materially raising the quality of officers in the mercantile marine. But their advantages are only offered to sons of gentlemen who can afford to pay fifty guineas a year, and are beyond the reach of the great mass of the seafaring population. The *Indefatigable* training-ship in the Mersey, however, gives instruction in navigation to boys paying 20*l.* a year; and our Associate, Mr. Tiuné, has recently given a sum of 300*l.* to the Committee of the *Indefatigable*, the interest of which is to be expended in annual prizes for proficiency in navigation, nautical astronomy, surveying, and in

It will have been seen, from the above brief review, that, although the *Conway* and *Worcester* are undoubted steps in the right direction, and will eventually leaven the merchant service with really good officers, England is behind most other maritime countries in the means and facilities afforded for educating practical geographers and explorers by sea and land. The subject of improving and enlarging the scope of geographical instruction in this country, seems to be one which might fitly engage the attention of the Council of our Society. How this may best be done is a question for consideration; but it is clear that a great improvement is needed. Except the *Worcester* and *Conway*, there is satisfactory provision for efficient instruction in only one of our principal seaports. No doubt the teaching, which is so much needed, might be introduced into many existing schools, especially in our large seaports. A navigation class might be drafted on to the present system of education and, with a little encouragement, a special interest in navigation and nautical astronomy might be created and fostered, among a large number of boys in such schools. The following measures would, probably, lead to the desired end; and it may be found that, as regards some or all of them, the Council might, either by representations or advice, or by active intervention, take a useful part in the good work. The object, in the interests of the Society, would be, by the provision of the means of instruction, largely to increase the number of those who have a practical knowledge of nautical astronomy, applied mathematics, and kindred subjects.

Recommendations.

The first step, and the most urgent, is to induce the Board of Trade to act upon the intention expressed in the Circular of 1850, and so to raise the standard of the examinations as to secure a thoroughly efficient education. The present system prevents the *Conway* and *Worcester* from doing all the good that they might do if a real training was required. Such requirement would also make the establishment of schools, like that at Hull, in the other large seaports, inevitable. The Board of Trade should also be urged to recognise the examinations passed by strength of classes held in connection with the Department of Science and Art by having the certificates with a memorandum recording the fact. It would thus become a simple advantage to have passed the South Kensington examinations, and a demand for real instruction would in time arise, leading to the formation of additional schools and classes. At the same time, as the examination is not compulsory, no reasonable objection is apparent to this simple recognition of a fact by the Board of Trade.

Secondly, the subject of navigation and nautical astronomy ought to be included in the system of education adopted in numerous large schools, especially in the seaports. If the Council granted prizes to navigation classes in such schools, in connection with a syllabus which it may approve, such classes would certainly be started. Eventually they might be developed into something more than what now exists at Hull, and real good would be done.

The Education Department allows several of the sciences and arts to be taught for marks in the examinations for certificates for teachers in elementary schools, and for additional payments. But navigation and nautical astronomy are not included, so that no inducements are offered to teachers, to take them up. In the new code, navigation and nautical astronomy are also omitted. England owes so much to her sailors, yet the sciences which are so necessary for them, are excluded; while nearly all other sciences are included. The Council should be asked to include these subjects among those in which marks are to be given at their examinations for certificates and additional payments.

be men qualified to teach navigation and nautical astronomy in many Board Schools throughout the country. Teachers would endeavour to form evening classes on these subjects, for the sake of the fees.

The Science and Art Department does not include practical knowledge of instruments, of surveying, and mapping, in its examination. It is of very little use to a lad that he can work out a longitude by chronometer or lunar, if he has never seen a sextant, much less ever attempted to take an altitude. "Awkwardness—want of deftness—can be distinctly seen in the adult, when he has not been an early observer." The Council might arrange with schools, such as the Long Millgate Science and Art Grammar School at Manchester, and others where nautical astronomy is taught, to institute examinations in the construction, adjustments, and use of instruments, and to give prizes. A syllabus of the knowledge required should be prepared,* and a text-book might be sanctioned and published, embracing all that the Council requires. Where new schools or classes are formed, the syllabus approved by the Council might be recommended for adoption. Prizes for proficiency in geography might very usefully be given, by the Council, to successful students in the *Worcester and Conway*.

In these and other similar ways the Society might do good service to geographical science, and I therefore venture to submit the subject for the consideration of the Council.

Jan. 1882.

LIST OF SCHOOLS

where Navigation and Nautical Astronomy have been taught since 1875.

NAVIGATION ONLY.

- Indefatigable*—Training Ship, Liverpool.
- Barrow-in-Furness*—Wesleyan School, Dalton Road.
- Boston*—National School, 11 Pump Square.
- Bristol*—Trade School (*formerly, not now*).
- Devonport*—British School, St. John Street.
- Falmouth*—Polytechnic Institute.
- Grimsby*—Primitive Methodist School, Garibaldi Street.
- Keyham*—St. James National School.
- Plymouth*—George Street Schools.
 - " Holy Trinity Boys' Schools.
 - " Hooe National School.
 - " Science and Art College, Buckland Terrace.
- Scarborough*—Mechanics' Institute.
- Shields, N.*—Christ Church School, Albion Street.
 - " " Kettlewell School, George Street.
 - " S.—Winterbottom Nautical School.
 - " " Mr. Ainsley's School.
 - " " Mr. Duncan's School.
- Southampton*—Hartley Institute, School of Science and Art.
- Sunderland*—Bishop Wearmouth National School.
- St. Helens*—Love House School, Halefield Street.

* The following has been suggested :—

1. Knowledge of the construction, adjustments, and use of instruments.
2. Determination of geographical positions from observations.
3. Rough surveying, determination of heights, bearings and distances.
4. Construction of rough map of a country to scale.
5. Calculation of heights by the barometer.
6. Meteorological observations, reduce them to averages, and draw conclusions.

Swansea—Trinity Church School.
Rochester—Sir J. Williamson's Mathematical School.
Truro—British School, Kenwyn Street.
Wulmer—National School.

NAVIGATION AND NAUTICAL ASTRONOMY.

H.M.S. Worcester—Nautical Training College (Greenhithe).
H.M.S. Conway—School Ship (in the Mersey).
Greenwich—Royal Hospital School.
Gosport—Market House.
Hull—Navigation School.
Leicester—Board School, Cumberland Street.
Manchester—Grammar School, Long Millgate.
Plymouth—Navigation School.
Christ's Hospital—Mathematical School.
Farmouth—School of Art and Navigation, S. Quay.
North Shields—W. H. Thorn and Son, 5, Waterville Terrace.
Leith—Navigation School, Custom House Chambers.
Glasgow—Mechanics' Institute, 38 Bath Street.

The above memorandum having been carefully considered by a special committee to whom it was referred, the following Report was drawn up by them, and subsequently confirmed by the Council:—

"The Committee are of opinion:

"That the encouragement and extension of education in subjects required by practical geographers and explorers by sea and land will further the objects of the Society.

"That the improvement of the education of the seafaring classes is likely to further, directly and indirectly, the interests of Geographical science.

"That action towards this end may usefully be undertaken by the Council.

"The Committee, therefore, submit the following recommendations:—

"I. That a representation be made to the President of the Board of Trade by the Council, in conjunction with others who are specially interested in the education of the seafaring classes, suggesting that the time has come for raising the standard of the examinations for Masters and Mates in accordance with the intention of the Board, announced in the Circular of 1850; with the object of rendering a thoroughly efficient education necessary to success, and further asking that the Board of Trade should recognise the examinations of the Science and Art Department, by noting on the Certificates of Masters and Mates the fact of their having passed such examination.

"II. That a representation be made to the Lord President of the Council suggesting that navigation and nautical astronomy should be included specifically amongst the science subjects for which marks are given at examinations for certificates and additional fees.

"III. That a syllabus be approved by the Council, and recommended for adoption in schools and classes which give instruction in the following subjects:—

"Knowledge of construction, adjustments, and use of instruments.

"Determination of geographical positions from observations.

"Rough surveying, bearings and distances, determination of heights.

"Construction of rough map of a region to scale.

"Meteorological observations, reduction to averages, and drawing conclusions.

And that prizes be offered, if classes are formed with such a course of study at a school at Liverpool, and at the Bristol Trade School.

"IV. That a prize, consisting of an atlas, be annually presented by the Council to the best boy in the examinations for geography on board each of the ships *Conway* and *Worcester*.

"V. That, with a view to the whole subject being brought prominently to public notice, the Memorandum by the Honorary Secretary submitted by order of Council to their Committee be published in the 'Proceedings.'"

Obituary.

Charles Darwin, M.A., F.R.S.—In common with the other chief scientific societies of the metropolis, we have to mourn, this month, the loss of one of our most illustrious members—Charles Darwin, who died at his country residence, henceforward to become classic ground, in the little Kentish village of Down, on the 19th of April. Mr. Darwin joined our ranks, as a life member, in 1838, not long after his return from his memorable voyage in the *Beagle*. We cannot of course claim him as a geographer, in the usual acceptation of the term, but as a scientific and observant traveller, taking in the whole range of the sciences, accurate in everything he recorded and fruitful in his reasoning, he was a typical geographer in the wider sense. In this respect his 'Journal of a Naturalist' may be regarded as a model, and it is a matter for surprise that it has not led to the formation of a more numerous school of travellers of the same class, in this country, than it has done. The volume teems, moreover, with observations and generalisations in physical geography, and his method of dealing with such subjects is one which must be adopted, should this department of knowledge ever attain, what as yet it is far from approaching, the dignity of an inductive science.—Although Mr. Darwin took considerable interest in our Society, and was a diligent reader of its publications, as shown by the frequent citations of the 'Journal' in some of his works, he appears never to have contributed a paper himself, except a short communication published in the ninth volume of the 'Journal' on the subject of "a rock seen on an iceberg in 61° south latitude."

Mr. Darwin was born at Shrewsbury on the 12th of February, 1809; he was therefore in his 74th year when he died. It was soon after taking his degree at Cambridge in 1831 that he offered his gratuitous services as geologist to the surveying expedition in the *Beagle* under Captain FitzRoy. With this expedition he remained throughout the five years it lasted, from 1832 to 1836. His bodily health, as it is well known, received during this voyage irreparable damage, necessitating great care and the husbanding of his strength for the remainder of his life. Happily for science and humanity, he lived long enough to work out the grand ideas on the origin of species and co-related phenomena of life, which he had conceived during those years. He was buried, as was fitting, near the grave of Sir Isaac Newton, in Westminster Abbey; on the 26th of April.

Major-General Sir Robert Michael Laffan, R.E., K.C.M.G.—The death is announced at Bermuda on March 22nd of Sir R. M. Laffan, who had succeeded General Sir J. H. Lefroy, B.A., as Governor and Commander-in-Chief of the Bermuda Islands in 1877. Sir R. Laffan obtained a commission in the Royal Engineers in 1837, and served for some time on the Cape of Good Hope frontier and in Kaffirland, proceeding afterwards to the Island of Mauritius. In 1847 he became Commanding Royal Engineer at Belfast, holding the same appointment at various places during the remainder of his military career. He was also employed by Her Majesty's Government on several confidential missions in Belgium, France, Egypt, Ceylon, &c. Sir R. M. Laffan retired from the army as Major-General in 1877, and was

appointed a K.C.M.G. in the same year. He had been a Fellow of our Society since 1849.

Captain Hans Busk.—We have also to record the death of Captain Hans Busk in London on March 11th, in his 67th year. He was the eldest son of the late Mr. Hans Busk, of Glenalder, Radnorshire, and was educated at King's College, London, and Trinity College, Cambridge, where he graduated as a Bachelor of Arts in 1839, being called to the Bar two years later. Captain Hans Busk was best known by his connection with the Volunteer movement, of which he claimed to have been the sole originator. Captain Busk belonged to the Victoria (1st Middlesex) Rifle Volunteers, and had been a Fellow of our Society since 1873.

The Pundit Nain Singh.—We have received from Colonel Edmund Smyth the following interesting details regarding our recently deceased gold medallist Nain Singh:—

THE GRANGE, WELWYN, HERTS, *8th April, 1882.*

DEAR SIR,—I saw in the obituary of the *Times* of the 15th March, a notice of the death of the famous Pundit, Nain Singh, and as I happen to have known him, in years gone by, perhaps better than any one else, I send you this short account of him for publication in this month's 'Proceedings.'

First I will explain how I think he and the others who were trained as explorers by Colonel Montgomerie came to be called Pundits. Nain Singh was a Government schoolmaster in the village of Milum, District of Johar, Province of Kumaon, in the Himalaya, and was, I think, the first man sent to Colonel Montgomerie to be instructed in the use of surveying instruments, and his title of Pundit (which means schoolmaster) seems to have stuck to him during the remainder of his life. The same name was also given to the other explorers who followed him, who were not Pundits at all. Pundit is a title generally given to learned Hindus, but schoolmasters are always called Pundit whether learned or not.

Nain Singh belonged to a peculiar set of people, generally called Bhootiahs (quite different from the Bhootiahs, or Bhootanese, of Bhootan), who inhabit the highest accessible parts of the different valleys in Kumaon and Gurhwal, which form the head-waters of the rivers Ganges and Kali (called Sardha or Surju lower down). Their villages are situated at an elevation of from 10,000 to 13,000 feet, at the foot (on the south side) of the various passes leading into Tibet; they are well and substantially built, though only occupied from June to November in each year. The Bhootiahs pass their lives in trade with Tibet, and they are the only people allowed by the Tibetan authorities of Nari-Khorsum (that part of Tibet which is the basin of the Upper Sutlej river, and north of Kumaon and Gurhwal) to enter their country for purposes of trade. From June to November they are constantly going backwards and forwards over the passes, bringing the produce of Tibet (borax, salt, wool, gold-dust, also ponies) and taking back grain of all kinds (as no grain is grown in that part of Tibet on account of its altitude and want of water), English goods, chiefly woollens, and other things. The goods are carried on the backs of sheep, goats, ponies, yaks, and jhoopos (a cross between the Tibetan yak and the hill cow). During the remainder of the year they move down to the foot of the hills and sell their produce to the Buniabs or traders, who meet them for that purpose at the different fairs held at Bagesar, Ramnugur, Kasipur, Burmdeo, Kotdwara, and other places. Most of them have another set of villages in the lower hills besides those I have mentioned close to the passes, which their families occupy during the cold weather. They are a hardy and enterprising race, and many of them find their way during the cold weather to Delhi and Meerut, and some as far as Bombay and Calcutta, where they can purchase English goods at a cheaper rate.

The origin of these people is uncertain; they have Hindu names, and call themselves Hindus, but they are not recognised as such by the orthodox Hindus of the

plains or the hills. While in Tibet they seem glad enough to shake off their Hinduism and become Buddhists, or anything you like. I was employed for many years in Kumaon and Gurhwal and knew these Bhootiahs perhaps better than any one else. In 1862-3 I was in correspondence with Colonel (then Captain) Montgomerie—I think it was about an expedition I was going to make into Tibet—and hearing he wanted some trustworthy men to train as explorers in that region, I strongly recommended him to engage some of these Bhootiahs, both on account of their thorough knowledge of the Tibetan language, and also because they had the entrée into the country. He asked me to select two, and send them to him to be trained. I accordingly chose our friend Nain Singh, who was then employed as Pundit (or schoolmaster) of the Government school of Milum, in Johar, and the second man I chose was his cousin (not brother, as stated in the English translation of Nain Singh's journal) Manee or Maun Singh, who was Putwarie or chief native official of Johar. Manee was far superior to Nain Singh in position, wealth, and intellect, and might have done well, but unfortunately he was too well off in his own country to take to the rough life of exploration.

After being trained they were both sent off together, in January 1865, with directions to trace the great river Brahmaputra from its source in the mountains, east of the Mansarowar Lake, to Lhasa, a supposed distance of 800 miles, and in returning to take, if possible, a more northerly route. They crossed the Johar Pass from Milum, and met with great difficulties in Nari-Khorsum; it had probably become known they were an exploring party; they had to return twice, and it was then resolved to try and make a start from Nepal; there they also met with difficulties, and Manee seems to have been discouraged and left Nain Singh, and after making a rather long tour in the north of Nepal, he returned home and is, I believe, still Putwarie of Johar. Nain Singh, however, stuck to his work, and after some further delay managed to join a party who were going from Nepal to Lhasa. He entered Tibet from Nepal by the Kirong Pass, and after travelling due north for about 130 miles, struck the great river at the monastery of Tadum, and then, turning to the east, followed the course of the stream for 600 miles till he reached Lhasa. He stayed there some months, recruiting his finances by turning his old profession of schoolmaster to account, and teaching the Tibetans arithmetic. He returned the same way as far as Tadum, and then explored new ground for 200 miles until he reached the sources of the Bramaputra in the mountains, not very far from the Mansarowar Lake. This was in 1866.

In the following year, 1867, Nain Singh tells me in one of his letters which I still have, he was sent by Colonel Montgomerie over the Mânâ Pass (near the temple of Badrinath) to Gartok (the capital of the Tibet district of Nari-Khorsum), to Chujothol, and the gold mines of Thok-jalung, the climate of which place he compares with that of the Mansarowar Lake, to give me an idea of it, as he knew I had been there. Thok-jalung he describes as much colder. He gives the elevation as 15,000 feet. This is evidently a mistake, as in his journal it is, I think, said to be 16,300 feet. That of the Mansarowar Lake is 15,200 feet, and this would account for the difference of temperature. He found about 500 tents of miners there, and says that to avoid the cold (cold wind I suppose) these tents were pitched in great holes. Captain Montgomerie's account of this important journey, with the tables of observations taken by "the Pundit," are published in the Society's 'Journal,' vol. 39.

I used to hear very frequently from both Nain Singh and Manee, but can only find four of their letters now, which I shall be glad to lend to any one wishing to see them. They are written in Hindee. One is from Manee, the other three from Nain Singh. In two of these letters he informs me of the great loss he had sustained, in being robbed of the gold chronometer given him by the Royal Geographical Society in 1868. It was stolen from him six months after he received it, and

while, he says, he was in the performance of his public duties. The fact is, he entrusted it to some one to take to his home, and the man stole it. He was much distressed, and expressed a hope that another chronometer exactly like it, with the same inscription engraved on it, might be sent to him, and he would gladly pay the cost of it; and then he went on to write in Hindee character the English words of the inscription, which were these:—"De President and Council of de Rael Jographical Society of London to Pundit Nain Singh for his great Jographical exploration. 25th May, 1868."

The Council was not able to comply with Nain Singh's request, but in May, 1877, the much higher honour of a Royal medal was awarded him in these terms:—"The Victoria or Patron's medal is awarded to the Pundit Nain Singh, for his great journeys and surveys in Tibet, and along the Upper Brahmaputra, during which he has determined the position of Lhasa, and added largely to our positive knowledge of the map of Asia." Colonel H. Yule, who had taken all along the greatest interest in the man and his work, received the medal at the anniversary meeting on behalf of Nain Singh, and in his reply to the eloquent words in praise of this native explorer addressed to him by the President, said: "He is not a topographical automaton, or merely one of a great multitude of native employés with an average qualification. His observations have added a larger amount of important knowledge to the map of Asia than those of any other living man, and his journals form an exceedingly interesting book of travels."

For the last few years of his life Nain Singh had retired into private life, and lived in comfortable circumstances during the hot weather in his native village of Milum, where his cousin and former companion Manee was Putwarie; and during the cold weather on a small *jaghire* or estate in the plains given to him by the Government for his services. He died at Moradabad (I believe on the 1st of February last), of cholera, contracted at the great Jannary fair of Allahabad. He must have been about fifty-seven years old. Nain Singh was employed for many years under me, and I always had a very high opinion of him; a more truthful or reliable man could, in my opinion, not be found for the work he was called upon to do. There may be mistakes in his journals, but no wilful ones.

I don't know what family he leaves behind, but there were two boys, nephews of his, educated at the Mission School at Almorah, who became Christians some years ago, and are now studying medicine at Agra, under Dr. Valentine.

The great exploit of Nain Singh, his journey from Nepal to Lhasa and back to the Mansarowar Lake, in 1865-6, need not be further described here. A translation of his journal, with introductory remarks by Colonel (then Captain) Montgomerie, was read before this Society on the 23rd March, 1868, and published in the 38th volume of the Society's 'Journal.'

EDMUND SMYTH, Colonel.

CORRESPONDENCE.

The Sources of the Irawadi and the Sanpo.

37, EDGWARE ROAD, W.

Having had engineering charge of the districts in British Burma through which both the Irawadi and Salween rivers run, and constructed many miles of embankment along the former river, Major Sandeman's paper read at the meeting of March 13th was naturally of great interest to me. I had intended to make some remarks upon it in the discussion which followed, but the lateness of the hour prevented me; on this account I beg permission to send you the following observations, for insertion in the next number of the 'Proceedings.'

Previous to the reading of the paper, I was of opinion that the portion of the

Nu-kiang above lat. $27^{\circ} 10'$ belonged to the Irawadi river, and not to the Salween; and that the portion of the Lang-tsan-kiang above $27^{\circ} 10'$ should be ascribed as the headquarters of the Salween. My opinion was based upon the unlikelihood of a west to east bend, nearly 70 miles in length, occurring in that latitude when both the upper and lower portions of the river's course were shown as running in a straight line, nearly north and south, for hundreds of miles both above and below this unnatural bend. On looking into the original maps and into Du Halde's book on China, I found that the Jesuits had finished their map of Yunnan where the parallel of $27^{\circ} 10'$ cuts the Salween river, and that the upper portion of the Salween, and indeed the whole of Tibet, was merely a compilation from itineraries and information collected by two Lama surveyors who were sent to survey the country. The outcome of their labours, together with the surveys of the provinces of China which had been carried out by the Jesuit missionaries, were forwarded to D'Anville, with the information that the Lama survey was only approximately correct, and with the request that, from the information he had within his grasp, he would fill in and correct the survey and make a general map of the whole country. The Lama and the Jesuit surveys seem to have been connected by Père Regis's joining the fragments of the Salween together, to show simply that they were portions of the trunk of the same river; in the same way the Lang-tsan-kiang was joined with the Mekong. This piece of cobbling was faithfully copied by D'Anville on his general map, and has since been unsuspectingly followed by all succeeding cartographers; some of them have, however, artistically pared off the ugly corners of the bend and substituted for it, perhaps for the sake of symmetry, a nice-looking, easy-flowing curve, which has quite destroyed the accuracy of the course of the Salween for some distance below the point to which it was surveyed by the Jesuits. Through this error D'Anville showed the course of the Salween above lat. $27^{\circ} 10'$ as running in (Greenwich) long. $97^{\circ} 51'$, or in identically the same position and direction as the Nam Disang (Mehka or eastern branch of the Irawadi) on Lieutenant Wilcox's map. That the Nu-kiang or Lu-kiang (Salween) and the Lang-tsan-kiang enter Yunnan, and do not rise there, is clearly stated by Père Regis, who with P. P. Fridelle and Bonjour, surveyed that province. This fact, with the later information received from Mr. Cooper, who has travelled along the Mekong above lat. $27^{\circ} 10'$, and M. Desgodins who has lived on the Salween between lat. 27° and 28° , clearly uproots every idea that the Nu-kiang (Salween) above lat. $27^{\circ} 10'$ is a branch of the river Irawadi.

The Jesuit map of Yunnan seems to be reliable; the latitudes mapped by them of Yunnan, Tali, and Momein, are the same as those of Mr. Baber and Captain Gill; the latitude of Likiang is out only $0^{\circ} 13'$; and the longitudes differ only from $0^{\circ} 3'$ to $0^{\circ} 18'$. We may note here that the Salween has been depicted by the Jesuits crossing lat. $27^{\circ} 10'$ in long. $98^{\circ} 36'$; lat. $26^{\circ} 30'$ in long. $98^{\circ} 36'$; and lat. 26° in long. $98^{\circ} 29'$; or in a position slightly trending east of north.

Having thus shown that the Nu-kiang is the upper trunk stream of the Salween river, and not a branch of the Irawadi, I will proceed to discuss the question whether it is absolutely necessary that the river Irawadi should have its sources above latitude 28° . On studying Mr. R. Gordon's book on the river Irawadi, one is astonished to find that the whole of his data for the floods in the upper portion of the Irawadi is incomplete: there is no one single flood discharge of the river at Mandalay or at Bhamó, that is not based on assumptions. He assumes that the velocity of a flood at Mandalay, where the extreme rise above the dry weather level is only 26 feet, is the same as that at Saiktha, where the rise is about 40 feet. He assumes that a flood section taken by Lieutenant Heathcote, in 1854 below Mandalay, was that of an ordinary flood. In face of Dr. Bayfield's evidence that the bank of the

river at Bhamó was only from 20 to 30 feet high above the low water of the dry weather on the 10th January; in the face of Captain Hannay's declaration that, when the river was running with an almost imperceptible current through the defile above Bhamó, on the 22nd December he found, in a place where the river was restricted to only 80 yards in breadth, the height of the flood in the rains was only 50 feet above the then level of the river; in face of Dr. Griffiths, who had an admirable opportunity of judging, having passed through the defile when the river was rising at the rate of 16 inches an hour, declaring that 40 feet rise in the defile was equivalent to 20 feet in the open river,—Mr. Gordon accepts with unquestioning confidence the assertion of a Mr. Rose that he had measured the height of the flood rise at Bhamó above the low water of the dry weather at 60 feet. Mr. Rose may have measured the extreme depth of the river at Bhamó during a flood, but I much doubt whether his measurement was that of the height of the rise of the flood above the lowest level of the year. Mr. Gordon then, from knowing the breadth of one channel in the dry weather, assumes not only what its cross section in the rains will be, but what the area of the cross sections of two other unmeasured channels will discharge when this very doubtful flood rise of 60 feet occurs. With these assumptions, and a surmise that the flood will have the same velocity as at Saiktha, he calmly assures us that the river at Bhamó would discharge a volume of 1,200,000 cubic feet per second. What can one say to calculations based upon such suppositions? What credit can be placed in them? If Dr. Bayfield's, Dr. Griffiths's, and Captain Hannay's observations were correct, the flood discharge of the river at Bhamó would certainly not be more than one-third of that assumed for it by Mr. Gordon. The lowest dry weather discharge of the Irawadi above Bhamó, when restricted and passing through the Muntgoun defile, in lat. $25^{\circ} 30'$, taking the dimensions given by Mr. Strettel, when he passed through it, could not have been more than 15,000 cubic feet per second, or his boatmen could not have poled against the stream.

The area of the Irawadi basin between Bhamó and lat. 98° is about 30,000 square miles. Taking the flood discharge of the river at Bhamó as about 400,000 cubic feet per second, the discharge per square mile would be about $13\frac{1}{4}$ cubic feet per second, or about one-fourth of the discharge per mile from the country into the Dibong branch of the Brahmaputra, which lies in the same latitude, actually nudging against it, or only separated by an arm of hills, which, running from north to south, do not intercept the drift of the south-west monsoon rains. This 30,000 square miles of area, in which the sources of the Irawadi most likely take their rise, is a district bounded on three sides by high and snow-capped ranges, which precipitate the moisture of the heavy rain-bearing clouds drifting up the valley of the river, and might reasonably be supposed to supply even the quantity of outflow that Mr. Gordon assumes to pass through the channel of the Irawadi at Bhamó; if this was the case, it would still be supplying one-fifth per square mile less than is actually discharged from the area drained by the Dibong. It is impossible for me to comprehend how Mr. Gordon can assume that his river, with its dry weather flow, in lat. $25^{\circ} 30'$, of 15,000 cubic feet per second, must receive the Sanpo, and thus have a course of over 1400 miles in length above that place; and I think that his opinion may be dismissed without further consideration.

I will now consider the theory of the Sanpo being the upper course of the Dihong river. The arguments on this side have been most ably stated by Colonel Yule in his 'Introductory Essay' prefacing Captain Gill's 'River of Golden Sand.' On looking at the Government of India map, issued in 1881, we notice that the drainage area of a large portion of hills, which have not been surveyed, lying between 92° and 95° long., has been divided by the cartographer into compartments

which are at present only the fruits of surmise; if these are expunged, we have an area of 7500 square miles lying behind a snow-capped range of mountains, with peaks ranging from 14,316 to 21,552 feet above mean sea-level, which must exclude from this area all of the low-lying, heavy, rain-bearing clouds brought up by the south-west monsoon. The drainage from this area probably could not exceed, even when the snow is melting, 10 cubic feet per second for each square mile of area, and the total discharge would not be more than 75,000 cubic feet per second.

The whole of the drainage basin of the Dibong is exposed to the full drift of the south-west monsoon, and the rainfall is therefore very heavy; the discharge of the river per second as given by Lieutenant Harman is 144,000 cubic feet. The area of the basin being 2800 square miles, the discharge is at the rate of a little over 51 cubic feet for each square mile of area.

The Subansiri river has a watershed to the south of the snowy range of 6500 square miles, the flood discharge of the river is only 240,000 cubic feet per second; supposing that none of the drainage from behind the snowy range enters the Subansiri, the discharge per square mile from the area in front of the range alone would be about 37 cubic feet per second, or 14 cubic feet less than the discharge from the basin of the Dibong. The reason of this lesser discharge is evident, for the watershed of the Subansiri is more or less protected on its south and west sides from the drift of the south-west monsoon by the sheltering hills.

If the Sanpo passes close to the Jungla peak, on its suppositious course towards the Irawadi, and threw out no branch to the southwards, the watershed allowed to the Dihong would be 4500 square miles; calculating the discharge of this at 37 cubic feet per mile per second, the basin of the Dihong being protected like that of the Subansiri, the discharge would be only 166,500 cubic feet per second; adding to this the 75,000 cubic feet draining from behind the snowy range, the gross discharge would be, at the time of extreme high flood, only 241,500 cubic feet per second; but the discharge of this river has been proved to be 423,000 cubic feet per second; it may therefore be fairly asked, where does the unaccounted for 188,500 cubic feet of flood water come from? Only one answer can reasonably be given to this,—from the Sanpo, the great river of Tibet.

It is much to be regretted that Major Sandeman has based his survey of the country lying between Bhamó and $26^{\circ} 8'$ lat. upon the position of Bhamó as given by Captain Bowers, viz. $96^{\circ} 54'$ E. Had he adopted Mr. Ney Elias's observation, which I believe to be the most reliable, the Nam-kioo river, if produced, would not only run in the same direction, but actually coincide with the Maleeka branch of the Irawadi river, and both the appearance and the accuracy of the map would be much improved. If Major Sandeman will shift his survey this $0^{\circ} 14'$ to the east, so as to make it agree with Mr. Ney Elias's observations, he will find his position for that wonderful Nongsa lake, which even that sharp-sighted native of Kacho could not see across, traverses the course of the Salween river. He may then, if he will study Mr. Baber's remarks upon the native ideas of distance (by which it appears that one English mile equals two Chinese li along roads in a flat country and from five to fifteen where they pass over hills), find it rather puzzling to accurately determine the position of his Burmese Nyanza.

Major Sandeman's deductions from Alaga's observations appear to me not always warranted. He presents us with the information that the Maleeka, owing to the melting of the snow, was in flood from the 24th January to the 18th February, and that this flood caused a rise (vide his Report) at Saiktha from the 19th February to the 3rd March, when it ceased; but that the Mehka does not rise until April, and that both of these rivers take their rise in the same snowy range. Does Major Sandeman really infer that the snow at the sources melts during a fortnight of the coldest part of the

year, whilst at the sources of the neighbouring stream it is allowed to follow the ordinary course of nature and commence to melt, as we are told by many observing travellers it does in that latitude, towards the end of April? It appears, from Dr. Bayfield's journal, that heavy rains are not unusual, in the district west of the Maleeka, both in January and February,—the phenomenon of a January thaw was therefore not required in order to account for the flood noticed in the Maleeka.

Major Sandeman draws another conclusion which I think is not quite exact. He states that the rainfall, in the district he is considering, must be heavy because of the quantity of hungry or rather thirsty leeches in the hills. When surveying for a road near Prome, where the rainfall is only from 50 to 60 inches, I found it nearly impossible to take a line of levels, owing to the number of leeches attacking the staff-bearers.

The next time an explorer is sent to collect information as to the courses and sources of rivers, it might be as well to instruct him in the very simple method of measuring streams, without having to wade through them; he might be asked to use this knowledge, and bring back, as well, some facts as to the heights of the banks of the rivers above the water-level; the depths and the velocities of the streams would likewise be useful, the velocity can very easily be taken if the man has a companion. Such observations, with a few inquiries as to whether the streams flood their banks in the rains, would enable us to set the subject under discussion finally at rest. As it is there can be no doubt that Mr. Gordon will write another book, giving us we will hope more facts and less assumptions than before, and do his best to upset Major Sandeman's conclusions.

HOLT S. HALLETT, M.I.C.E., F.R.G.S.

Lake Shirwa or Kilwa, the source of the Lujende River.

H.M. CONSULATE, MOZAMBIQUE, February 11th, 1882.

Let me say one word on the interesting point that has arisen, regarding the upland lake which is the ultimate source of the Liendi or Lujende river.

I first heard of the Lake Kilwa being the source of this river about twelve months ago. The similarity between the names Shirwa and Kilwa at once struck me, as well as their stated proximity to each other, and I steadily kept in mind the possibility of their being one and the same during my further inquiries, and whilst on my late journey into the interior. The possibility, however, did not seem to strengthen as I progressed in both, and though I frequently asked the question "Is not Kilwa lake sometimes called Shirwa?" I never got an affirmative answer. In the January number of the 'Proceedings' just received, I notice that Mr. Johnson throws out a suggestion that the lake he saw was Shirwa, and that he mentions the existence of a place near to it called "Chilwa." The transition is an easy one between "Kilwa," "Chilwa," and "Shirwa," and I confess Mr. Johnson's guess seems strengthened by it. It appeared to me too bold a suggestion to hazard upon a mere similarity of names, and a proximity to each other, and though I am far from being convinced yet, I think there is a strong probability that the two reported lakes will be found to be one and the same. It has raised an interesting question for solution. If it is not settled before, I hope to be able to do this on my journey to Blantyre (on the highlands near Shirwa) and Lake Nyassa in the course of the present year. Within the next week or ten days I am leaving Mozambique on a coasting journey southwards, and I hope to visit the Quizungo, Tejungo, Licungo and other rivers, and gain some personal knowledge of them.

No. V.—MAY 1882.]

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Mount Cockburn, in the vicinity of the Moma and Quizungo, I should extremely like to visit, but we are in the midst of the rains, and the time is not suited to land journeys. If I hear anything of interest regarding that part of the coast, which is perhaps less known than any other, I shall not fail to send it you.

Yours very truly,
H. E. O'NEILL.

To the Secretary of the Royal Geographical Society.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

ASIA.

Hughes, [Major] W. Gwynne.—The Hill Tracts of Arakan. Rangoon (Government Press): 1881, sq. 8vo., pp. vi., 55, and x., map, frontispiece.

So little is known of the tract of country known as the Arakan Hills, lying between $92^{\circ} 35'$ and $93^{\circ} 30'$ E. long., and $20^{\circ} 30'$ and $22^{\circ} 10'$ N. lat., and of the tribes inhabiting it, that this treatise will be found of especial value,—the information contained in it having been obtained while the author (Deputy Commissioner, British Burma) was Superintendent of the district, which is one of the few portions of the Indian Empire where native superstitions have not given way to missionary and other education.

The physical features of the Hill tracts are characterised by ranges of hills, covered with dense bamboo and tree jungle, and drained by two large rivers, the Kooladan and Lemroo, on the banks of which the majority of the hill tribes reside. Both hill ranges and rivers run nearly directly north and south. From the highest point, over 4500 feet, the lower ranges appear to be a chaotic mass of hills, apparently the result of volcanic action. The entire area of the Hill district is over 5000 square miles, though the portion under direct and administrative control is restricted for the present to about 1300 square miles. The exact position of the sources of both the rivers above named is still unknown, as they rise in a portion of the Hill tracts still unsurveyed, but the Kooladan has been explored by Europeans for nearly 300 miles from its mouth, and the Lemroo to within 120 miles of its source; both are navigable by large boats and small steamers to the centre of the hills, after which, owing to rapids and rocks, navigation becomes difficult and dangerous. One of the more remarkable ranges of mountains is called Kyouk-pandoung (a drawing of which, by the author, from the outpost station of Tsamie, on the Mee river, is given as frontispiece), with a fine plateau of over 13 miles on the top, running almost due east and west, composed of sandstone and trap, and averaging from 3000 to 4500 feet in height. A large portion of its surface is entirely denuded of vegetation, and several acres are bare rock, indented here and there with remarkable holes, from 4 inches to 4 feet in diameter. Some old fruit and palm trees which still grow on it, and the small pagodas found on its top, corroborate the ancient tradition that many centuries ago it was the site of a large city, and the seat of government under a prince called the "Kan Rájá." This tradition refers to a period prior to the appearance of Gaudama; but from the freshness of a stone inscription on the top and the well-preserved state of a small pagoda discovered there in 1872, it is evident that the mountain has been peopled at no very remote date. Many miles to the east, on the Yomatoung, which separates Arakan from Pegu, is another prominent mountain summit called Pogoung-toung, also noticed in tradition as having been a halting place for Kan Yaza Gye on his way from the Irrawaddy to the Kooladan, prior to his founding the city on Kyouk-pandoung. This mountain is prettily wooded with cinnamon and other valuable trees and a dwarf species of oak, with a sheer precipice on one side of over 1000 feet; it stands out grandly in the distance, and forms a prominent landmark. The temperature on its top is

remarkably equable; a soft sea-breeze usually blows throughout the hot months, and the thermometer has not been known to rise above 85° in April and May, which are the hottest months in the year, when it is often over 103° in the plains. This range might supply the hill station which is needed in British Burma, and which could be established at a small cost, as a small steamer or large-sized steam launch drawing from three to five feet could come up from Akyab to within 22 miles of it all the year round, and the gradual ascent from the point of disembarkation to the top of the range offers no great engineering difficulty.

Both the fauna and flora, though comparatively unknown as yet, are varied and interesting, the absence of the peacock, which is abundant in other parts of Burma, being noteworthy. Of the domesticated animals, the gyal or gayal is the chief: its habitat is confined strictly to the hill ranges and districts of the eastern border, from Assam down to Arakan. Attempts to acclimatise this animal in the plains have generally been found to fail, as it pines and dies when removed from the mountains and streams, though it is as quiet as a cow in the hillside villages. The hill men also highly prize a white buffalo, much as a white elephant is held in great estimation at a lower level. Many very useful and valuable trees are found, either supplying timber or oils and gums.

The climate, especially in the valleys and along the river banks, is notoriously unhealthy, owing to malaria from the vast extent of uncleared jungle, and the thermometer is liable to extreme and sudden variations, from 56° in the morning to over 90° in the afternoon. From November to the middle of March the weather is cool and pleasant; April to June are trying months, and then the rains begin, preceded by violent storms, and continuing until October, with an average of 120 to 130 inches. Communication during the wet season is quite impracticable except by boat.

After a short modern history, Major Hughes discusses with considerable and interesting detail the tributary tribes residing within the administrative boundary, and which are classified as Kamees or Kumees, Mros, Chins, Chongthas, Chaws, and Koons. It is apparently unknown which of these are the aborigines, or which first settled in the hill tracts. The Kamees, numbering over 10,000 (including the allied Mros), form the largest division; they have been forced from their highland homes down to the river banks by the constant raids of stronger tribes to the north. The Chins are far wilder and more retiring than any of the others; they are peculiar from constantly tattooing the faces of their women (like the Nagas of Assam), and they pursue no steady or profitable occupation. The Chongthas are the remnants of the Arakanese who prior to the annexation were deputed on account of their supposed braveness and strength to settle high up the hills on the Kooladan, with the unsuccessful object of checking the marauding Kamees. They resemble to this day the natives of the plains in dress and manners, but by force of habit and time have become in customs and life part of the hill tribes; having almost entirely severed themselves from Buddhism. The Chaws, a small tribe, are an offshoot of the great Aryan family, and probably represent prisoners taken in Bengal; and the Koons, who have only recently come under subjection, are chiefly remarkable for their rapid improvement in civilisation. All these tribes have two common characteristics, viz. a wasteful method of rough cultivation, and the practice of slavery. Their customs, laws, implements, weapons, and various peculiarities are discussed by Major Hughes, who concludes with a notice of various trans-frontier tribes (Looshais, Shandoes, Chins, and Konesows), with a general political and economical summary, in which he deprecates the neglect of Burma by the English, and even the Indian, public.

A vocabulary of eight pages, in three dialects, is given in the Appendix. The map represents the eastern frontier of British India (scale 32 miles to the inch), showing distribution of tributary and independent tribes, boundaries, lines of communication, posts, &c.

Schrenck, Leopold von.—Reisen und Forschungen im Amur-Lande in den Jahren 1854-1856, im Auftrage der Kaiserl. Akademie der Wissenschaften zu St. Petersburg ausgeführt, und in Verbindung mit mehreren Gelehrten heraus-

gegeben. Band III. Erste Lieferung. Die Völker des Amur-Landes. Geographisch-historischer u. anthropologisch-ethnologischer Theil. St. Petersburg (Eggers & Co. and Glasunof): 1881, imp. 4to., pp. ix. and 310, map, illustrations. (*Dulau*: price 14s.)

So many years have elapsed since the commencement of the publication of this historical work that it may be as well to note here the dates and subjects of such parts of it as have as yet appeared. Of Vol. I., parts 1 & 2, descriptive of the Mammals and Birds of the Amur region, by Von Schrenck, were respectively published in 1858 and 1860. Vol. II. (apparently the only one as yet completed) comprises the *Lepidoptera* (by the late E. Ménétries, 1859), and *Coleoptera* (by the late Victor de Motschulsky, 1860) of Eastern Siberia and especially of the banks of the Amur, and the Mollusks of the Amur region and the North Japan Sea, by Von Schrenck, 1867. The present part is all that has appeared of Vol. III.; and of Vol. IV., parts 1 & 2 were issued in 1876 and 1877 respectively, the first by Von Schrenck, Dr. W. Köppen, and Dr. H. Fritsche, being Meteorological Observations in the Amur Region and the results deduced therefrom, and the second by Fritsche, on the Climate of Eastern Asia, with special reference to the Amur region, China, and Japan.

The present part is practically devoted to ethnographical subjects, the introduction of geographical references being solely on account of the distribution of tribes. After some introductory observations, in which the rapid disappearance of purely native races since the occupation by the Russians is referred to, the author gives a general sketch of the indigenous people (who sprung from three distinct racial stems, the Giljaks, Ainos, and Tungus), defining the present boundaries of their distribution, and the local influence of the civilised people of Eastern Asia, Chinese, Japanese, and Russians. The varied distribution of these races in historic times is then sketched from Russian, Chinese, and Japanese accounts; and the part concludes with a systematic arrangement on linguistic and physical (chiefly cranial and facial) grounds. The Giljaks are considered a family *per se*, and the Ainos (whose various supposed affinities are discussed) as belonging to the Palæasiatic type.

The map shows the distribution of 16 recognised divisions; the illustrations are purely anthropological, and include 5 phototypic plates of skulls.

Thomas, Edward.—The Indian Balhará, and the Arabian Intercourse with India in the Ninth and following Centuries. London (Trübner & Co.): 1882, 4to, pp. 16, woodcuts.

In this treatise, which originally appeared in vol. iii. of the 'Numismata Orientalia,' the author suggests a new and unexpected explanation of the much-discussed title of Balhará, used by the Arabian merchants who visited India in the ninth century, and which he reduces to the vernacular "Bará Rái" or "Greater King." He comments upon the geographical positions of the four great Indian monarchies of the period (A.D. 851), all of which were more or less Gangetic, intra or extra, or in general terms connected with the Bay of Bengal; and considers that the sway of the "Balhará" or Lord Paramount must have covered the outlet of the Ganges, and that his capital was then at Monghyr.

AFRICA.

Güssfeldt, Paul, Falkenstein, Julius, and Pechuël-Loesche, Eduard.—Die Loango-Expedition ausgesandt von der deutschen Gesellschaft zur Erforschung Aequatorial-Africas, 1873–1876. Dritte Abtheilung. Erste Hälfte. Leipzig (Paul Froberg): 1882, large 8vo., pp. 304, map, illustrations. (*Asher*: price 15s.)

The second part of this valuable work was published so long ago as 1879 ('Proceedings' for that year, p. 478). The present first half of the third part, by Dr. E. Pechuël-Loesche (who leaves the concluding six chapters, forming the second half of the part and the completion of the whole work, until his return

from his second voyage to Loango), contains the physical geography and hydrography, climatic and atmospheric phenomena, botany and zoology of the region. The meteorological portion (including exhibitions of celestial electricity) and the peculiar vegetation receive considerable attention and are specially illustrated; and the part is accompanied by a map of the Kuilu (scale 1:200,000) from 12° 7' E. long. to its mouth, with an erosion-section of part of its right bank. The following positions are given from Dr. P. Güssfeldt's astronomical observations: Reis Island 4° 27' S. lat. and 11° 40' E. long.; Mayombe 4° 12' S. lat.; Kakamueka, 4° 9' S. lat. and 12° E. long.

AMERICA.

Porter, Robert P., Gannett, Henry, and Jones, Wm. P.—The West: from the Census of 1880, a History of the Industrial, Commercial, Social, and Political Development of the States and Territories of the West from 1800 to 1880. Chicago (Rand, McNally, & Co.) and London (Trübner): 1882, 8vo., pp. vi. and 630, maps.

Although the general aim of this work is not geographical, it may be mentioned here from the useful descriptions contained in it of physical features in relation to the economical capabilities of the various States and Territories discussed.

Mr. Gannett, the official Geographer to the Census, has supplied those referring to Nevada, Colorado, and the Territories, for which his former experiences on the Surveys have well qualified him; and much of the detail of the Prairie States is by Professor W. P. Jones.

Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, Colorado, Dakota, Montana, Wyoming, Idaho, Utah, New Mexico, Arizona, Washington, Nevada, Oregon, and California are described from the point of view indicated by the title; the economic and historical details being in each case preceded by general geographical outlines, and sketches of the prominent physical features both as regards land and water, the surface geology and mineral resources, typical botany and zoology, and meteorological conditions.

An appendix contains some instructive material, in the shape of official data not obtainable while the work was being completed. Among other points is that of the area of the land and water of the States and Territories of the Union, a revision of which was found necessary by Mr. Gannett early in the progress of the geographical work of the Tenth Census. In some States many different estimates of area have passed current, differing from one another by thousands of square miles. The results of the various corrected estimates have been published in an extra Census bulletin, and from the data given it is clear that with the exception of the States surveyed by the General Land Office, in which county lines follow the boundaries of survey by townships, there still remains a great amount of uncertainty. This is especially the case in most of the States on the Atlantic border, with West Virginia, Kentucky, and Tennessee in the interior.

Adopting, however, the methods accepted as for the time sufficient by the Census officers, the total area of the United States is 3,025,600 square miles, of which 17,200 square miles may be considered coast water (bays, gulfs, sounds, &c.), 14,600 square miles rivers and smaller streams, and 23,900 square miles lakes and ponds, making a total water surface of 55,600 square miles, and 2,970,000 square miles of land.

Of the other material in the appendix, it may be noted that the gross population in 1880 is 50,155,783, omitting Indian Territory and Alaska, of which the inhabitants are not considered citizens, and also omitting all Indians not subject to taxation. As a rule there is a considerable excess of females in the older and a large excess of males in the newer States; the most thickly populated are New York, Pennsylvania, Ohio, Illinois, and Missouri. The heaviest percentage of foreign population is collected in and about the great manufacturing and commercial centres, and in the very newest of the Western

States and Territories. More than a quarter of the population of Massachusetts and New York are of foreign birth. A great popular delusion as to the extent of Chinese immigration is effectually dispelled by this Census, as the total Chinese population is shown to be only 105,465, of which California contains 75,132; whilst of people of African descent there are 6,580,793. The total Indian population is estimated as probably not far short of 250,000.

GENERAL.

Reclus, Elisée.—Nouvelle Géographie Universelle. La Terre et les Hommes. VII. L'Asie Orientale. Paris (Hachette): 1882, 4to., pp. 844, 7 coloured maps, 162 maps in text, 90 illustrations. (*Hachette*: price 1*l.* 5*s.*)

Volume VI., exclusively devoted to Russia in Asia, was published in 1881, and the present one is completed with livraison 415. The original limitation of the work to about 500 livraisons, forming from 10 to 12 volumes, is now found impracticable, and it is supposed that some 900 livraisons, making 15 volumes, will be required. This extension will materially increase its value, as the space already occupied by Europe (5 vols.) rendered a satisfactory treatment of the other great sections impracticable under the first scheme.

The present volume discusses the Chinese Empire (Tibet, Chinese Turkistan, Mongolia, and China proper being separately treated), Corea and Japan, and the political relations of these countries with Russia, from a geographical point of view, are concisely given in the preliminary considerations.

The larger maps represent Turkistan, the Pamir, and Thian-chan; Russian Asia and Chinese Tartary; Peking and its environs; the mouth of the Yang-tse-kiang, Canton; the bay of Osaka, and Tokio and its bay; and among the smaller ones are four representing the views of the connection between the Sanpu and the Brahmaputra or Irrawaddy taken by different geographers. This interesting question is discussed at some length, M. Reclus evidently inclining to favour the opinion of Mr. Gordon as to the identity of the great Tibetan and Burman rivers.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

THE WORLD.

Fischer, Teobaldo.—

- I. Fac-simile della Carta Nautica Araba (Caratterre Magrebino) del XIII. Segolo, illustrata da Teobaldo Fischer. Venezia, Ferd. Ongania, Editore 1881. 1 sheet (photo.) and title, in cover. Price 5*s.*
- II. Fac-simile della Carta Nautica di Pietro Visconte di Genova dell' Anno 1311, illustrata da Teobaldo Fischer. 1881. 1 sheet (photo.) and title, in cover. Price 5*s.*
- III. Fac-simile del Planisfero di Prete Giovanni da Carignano di Genova del XIV. Segolo, illustrato da Teobaldo Fischer. 1881. 1 sheet (photo.) and title, in cover. Price 5*s.*
- VI. Fac-simile delle Carte Nautiche di Francesco Pizigani dell' Anno 1373, illustrate da Teobaldo Fischer. 1881. 9 sheets (photo.) and title, in cover. Price 1*l.* 7*s.*
- VII. Fac-simile del Portolano del XIV. Segolo, illustrato da Teobaldo Fischer. 1881. 4 sheets (photo.) and title, in cover. Price 12*s.*
- XVII. Fac-simile delle Carte Nautiche di Battista Agnese dell' Anno 1554, illustrate da Teobaldo Fischer. 1881. 16 double sheets (photo.) and title, in cover. Price 4*l.* (*Dulau.*)

Hauser, Paul M.—Das Klydoskop. Graphisches Tellurium und darstellung der wirksamsten Anziehungs-Stellungen von Sonne und Mond zur Erde für das Jahr 1882 zur Uebersicht des Eintreffens der aus deren Constellationen resultirenden „verstärkten Anziehungen“; als die Ursache der Entstehung Udie Witterung beeinflussender“ atmosphärischer Hochfluthen, so wie der Meereshochfluthen. Nach astronomischen Daten ausgearbeitet und zusammengestellt von Paul M. Hauser. A. Hartleben's Verlag in Wien, 1882. (*Dulau.*)

The Klydoskop is intended to show, in a graphic manner, by the use of a circular, graduated diagram, in combination with certain astronomical data, the relative positions of the sun, moon, and earth, at any time during the year; also the attraction of the sun and moon on the ocean, and, by using the factors given on the diagram, their effects on the tides; and to furnish the means of testing in a simple manner, by the aid of given factors, the supposed effects of the attraction of the sun and moon, on the aerial ocean, as shown in the fluctuations of the weather.

The diagram is accompanied by twenty pages of letterpress and tabular matter, in which are given full instructions for its use.

EUROPE.

Artaria & Co.—Special-Orts- und Strassenkarte von der Hercegovina nebst Süd-Dalmatien und West-Montenegro. Mit Uebersicht der polit. Administration d. Occupations-Gebietes und eine Statist. Tabelle d. Kreises Mostar. Scale 1: 288,000 or 3·9 geographical miles to an inch. Wien, Artaria & Co. Price 1s. 6d. (*Dulau.*)

Austrian Government.—Karte der Central-Karpathen. Scale 1: 75,000 or 1 geographical mile to an inch. Price 2s. 9d.

—— Hypsometrische Karte der Central-Karpathen. Scale 1: 100,000 or 1·3 geographical miles to an inch. Price 3s.

—— Die Hohe Tátra. Scale 1: 400,000 or 5·5 geographical miles to an inch. Price 1s. 9d. Herausg. vom K. K. Milit.-geogr. Institut, Wien. Lechner, 1881. (*Dulau.*)

Bonnange, F.—Carte figurative de la propriété immobilière des congrégations religieuses en France. Paris, impr. Dufrénoy, 1881. (*Dulau.*)

Cherubini, C.—Carta in rilievo delle Alpi Occidentali e dell' Appennino Ligure alla scala dell' 1: 250,000 per le distanze e dell' 1: 125,000 per le altezze, dimensione 1·40 × 1·10. Turin, Roux e Favale. Price £8. (*Dulau.*)

Curtius, E., und Kaupert, J. A.—Wandplan von Alt-Athen. Scale 1: 6000 or 12·2 inches to a geographical mile. 4 Bl. fol. mit Text. Berlin, Schropp, 1881. Price 8s. (*Dulau.*)

Druten, van.—Kaart van Utrecht en omstreken. Scale 1: 50,000 or 1·4 inches to a geographical mile. Utrecht, van Druten: 1881, Price 3s. (*Dulau.*)

Düfief.—Carte de la Belgique à l'usage de l'enseignement primaire et moyen. 9 Bl. Brüssel, 1881. Price 14s. (*Dulau.*)

Freytag, Gustav.—Special-Touristenkarte der Niederösterreichischen Grenzgebirge. Nr. 3. Schneeberg, Raxalpe Semmering und östl. Schneecalpe. Scale 1: 50,000 or 1·4 inches to a geographical mile. Für Touristen bearbeitet von Gustav Freytag. Verlag und Eigenthum von Artaria & Co., Wien. Price 2s. 8d. (*Dulau.*)

Handtke, F.—Special-Karte vom südlichen Bosnien und Dalmatien, sowie dem Fürstenthum Montenegro. Scale 1: 600,000 or 8·1 geographical miles to an inch. Glogau, Flemming. Price 1s. 6d. (*Dulau.*)

Kiepert, Enrico.—Nuova Carta Generale dell' Italia Meridionale, ridotta principalmente dalla nuova carta topografica delle provincie meridionali (antico Regno delle due Sicilie) levata per lo Stato Maggiore Italiano e pubblicata nel rapporto 1:50,000 dall' Istituto topogr. milit. di Firenze (l'isola di Sardegna secondo carta del Gen. A. La Marmora), disegnata ed incisa sotto la direzione di E. Kiepert. Scale 1:1,000,000 or 10·9 geographical miles to an inch. Berol. Diterico Reimer, 1882. Price 6s. (*Dulau.*)

Loeschner.—Geologische Karte von Italien. Scale 1:1,111,111 or 15·2 geographical miles to an inch. Herausg. vom R. Comitato Geolog. Rom, Loeschner, 1881. Price 10s. 6d. (*Dulau.*)

Nissen, P.—Reisekart over det sydlige Norge. 2 Bl. Christiania, Cammermeyer, 1881. (*Dulau.*)

Russian General Staff.—Specialkarte des europ. Russland. Scale 1:420,000 or 5·8 geographical miles to an inch. Bl. 2: Pietrokow, 9: Jakobstadt, 21: Jemtland, 35: Vadsö, 36: Kola, 71: Kostroma, 78: Stavropol, 121: Bucht Chaipat, 135: Penderma Bay, 142: Talixkoje, 143: Szadrinsk, 144: Trojtzk (Ural), 145: Stanica Konstantinowskoja. St. Petersburg. (*Dulau.*)

Saxon General Staff.—Karte topographische des Königr. Sachsen. Scale 1:25,000 or 2·9 inches to a geographical mile. Herausgegeben durch das Königl. Finanzministerium. Bearbeitet im topographischen Bureau des Königl. Generalstabs. Lief. 8. Leipzig, Engelmann. 12 sheets, comprising Tannwald, Tharand, Hausen, Pönitz, Thallwitz, Markranstadt, Leipzig, Brandis, Wurz, Zwenkau, Stolpen, Sohnsitz, Schöna. Price 2s. each sheet. (*Dulau.*)

Schropp & Co.—Specialkarte der ober-schlesischen Bergreviere. Scale 1:10,000 or 7·3 inches to a geographical mile. Nach eigenen Aufnahmen und anderen amtlichen Material kartirt von dem königl. Oberbergamt zu Breslau. Berlin, Schropp & Co. Price 1s. 6d. each sheet. (*Dulau.*)

The following sheets are just published:—Sect. 2d. Trockenberg, Scharley. 2i. Kamin. 6a. Karf. 6d. Morgenroth Lipine. 7a. Schalsch. 7b. Schackanan. 7c. Makoschau. 7i. Bielschowitz. 9e. Brzenskowitz. 10a. Kochlowitz. 10b. Radoschau. 10d. Smilowitz. 10e. Petrowitz. 10f. Emanuelssagen. 11i. Bujakow.

Steinhauser, A.—Die österreichischen Alpen. 4 Bl. Scale 1:500,000 or 12·5 geographical miles to an inch. Artaria & Co., Wien, 1881. Price 6s. (*Dulau.*)

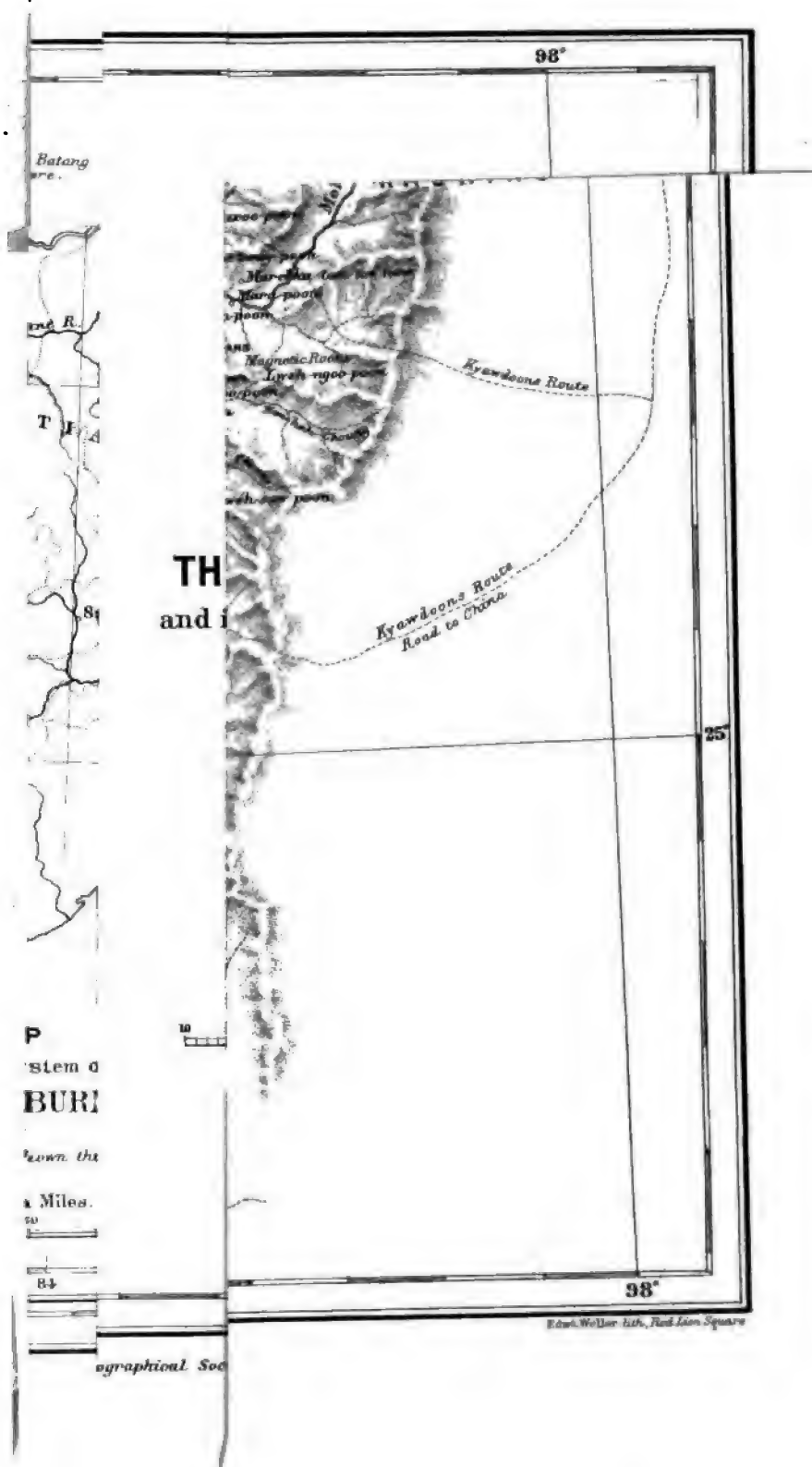
Generalkarte von Bosnien, der Herzegovina und dem Sandjak Nizet Bazar sammt Dalmatien, Montenegro und Serbien. Bearbeitet von A. Steinhauser, k. k. Regierungsrath. Scale 1:864,000 or 11·8 geographical miles to an inch. Artaria & Co., Wien, 1882. Price 2s. (*Dulau.*)

AUSTRALASIA.

Krömmel, Dr. Otto.—Tiefenkarte des Australasiatischen Mittelmeer's von Otto Krömmel. Equatorial scale 1:15,000,000 or 205·5 geographical miles to an inch. Kettler's Zeitschrift, III. Jahrgang, Tafel 1. Ausgeführt in Schauburg's Geogr. Anst. Lahr, Göttingen, 5-15 Sept., 1881. (*Dulau.*)

CHARTS.

Indian Marine Survey.—Chart No. 1258. Indian Ocean, Suez to Penang, including Zanzibar and Mauritius. Compiled by R. C. Carrington, F.R.A.S., 1881. Price 1s. 9d. No. 146. Port of Maulmain. Surveyed by Mr. Maurice B. 1879-80. Price 1s. 9d. Published at the Marine Survey Department, under superintendence of Commander A. D. Taylor. Calcutta, 1881.





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The Annual Address on the Progress of Geography for 1881-2.

By the Right Hon. LORD ABERDARE, F.R.S., President.

(Delivered at the Anniversary Meeting, May 22nd, 1882.)

THE PRESIDENT addressed the Meeting as follows :—

The Report of the Council which you have just heard read will have given you, I trust, satisfactory information regarding the financial condition and general progress of the Society. The plain, unadorned facts set forth in that document must have made it evident to you that a large amount of useful work is silently and unostentatiously accomplished by the Society during the year, independently of what appears in a prominent form before the public as the proceedings of our evening meetings. The magnificent library of geographical works and the collection of charts and maps are continually being consulted by Fellows and students; grants of various amounts are made in aid of expeditions; original maps, to the number, as you have heard stated, of twenty-four during the year, or at the rate of two per month, have been drawn in the establishment by the Society's draughtsman, and published in the 'Proceedings,' and a number of intending travellers are every season trained in the use of instruments for geographical observation; who, fired with a true chivalrous spirit, set forth armed at all points for scientific adventure in various regions of the earth.

It will be remembered that in 1879 means were provided by the Society for instructing travellers in practical astronomy, route surveying, and mapping. This training has since been regularly given by Mr. Coles, our Map Curator, to students engaged in various pursuits, who are about to visit distant parts of the world. From 1879 to the end of last year 532 lessons have been given to forty-two students; and the practical usefulness of this measure is now beginning to be apparent. We have already reaped important results from students instructed under this system, some of them having sent valuable reports

of their work in distant countries, and others contributed papers which have been read before the Society. I am glad also to have to announce that from one of them, Mr. Cuthbert Peek, we have just received the magnificent donation of 1000*l.* consols, the interest of which is to be awarded by the Council, as occasion offers, to intending travellers who have been duly trained, and who may be expected to accomplish useful scientific work in geographical survey, geology, and economic botany in little-known regions. Mr. Peek himself, who last summer made an exploring trip to Iceland, to test the value of the instruction he had received, has since been appointed one of the observers to the Transit of Venus Expedition to Queensland, and is now preparing for his voyage.

This year the Council has had under consideration a memorandum by our Secretary, Mr. Clements Markham, in which he suggests that our operations in this respect might by analogous measures be extended with great advantage to geographical science. The establishment in our seaports of efficient navigation schools, and classes for teaching applied mathematics and practical astronomy, would secure this end; and our interests as Geographers would thus become identified with those of all who desire to promote education in our mercantile marine. For it would certainly be a great gain to geographical science if officers in the merchant service were thoroughly grounded in the principles as well as in the practice of nautical astronomy and kindred subjects. Mr. Markham's memorandum has been published in the May number of our 'Proceedings.' It had previously been carefully considered by a committee, and their report has since been approved and adopted by the Council. As the encouragement and extension of education in subjects required by practical geographers must necessarily further the objects of our Society, and as the improvement of the education of the seafaring classes is likely to advance the interests of geographical science, the Council has come to the conclusion that action towards these ends may usefully be taken by the Society. It has been resolved to make representations on the subject to the Board of Trade and the Education Department, and also to offer prizes encouraging the study of subjects, a knowledge of which is required by explorers and practical geographers.

One step has already been taken in the direction indicated. The two training ships in the Mersey and the Thames for the education of cadets intended for the mercantile marine, the *Conway* and *Worcester*, have for several years been doing valuable national work. The lads leaving those ships have been instructed in the knowledge required by explorers, and, with practice, many of them might become useful geographical observers. It seemed desirable therefore that there should be some kind of connection between our Society and these excellent institutions, and this end could not be better secured than by

offering an annual prize, on board each ship, for the boy passing the best examination in geography. My proposal has been very cordially accepted by the chairmen of the committees of the *Worcester* and *Conway*, Sir George Chambers and Mr. Poole; and I trust that a stimulus will thus be given to geographical study, and a habit of intelligent observation aroused among the young cadets, which will hereafter advance the objects of our Society.

In my address last year I announced that Mr. Leigh Smith, who received our gold medal for his Arctic researches at the General Meeting of May 1881, was engaged in fitting out a fifth expedition with a view to further geographical discovery in the polar regions. He sailed on the 13th of last June, from Peterhead, in his steamer the *Eira*, with a crew of 22 men, with the intention, as I understand, of extending his former discoveries along the coast of Franz-Josef Land. He had no intention of wintering in those regions, although he had sufficient provisions on board to last until next August. Much anxiety was therefore felt when the *Eira* did not return last autumn, and the Council fully concurred in the representation made to them by Mr. T. V. Smith, the explorer's cousin, that it would be necessary to despatch a well-equipped naval expedition for the relief of the *Eira* next summer. Accordingly I addressed a letter to the First Lord of the Admiralty on the 12th of December, 1881, urging on his Lordship the despatch of an expedition by Government in the ensuing season. I particularly dwelt, in this letter, on the strong claim which Mr. Leigh Smith's former geographical services gave him to 'specially favourable consideration, and on these grounds I submitted that the gallant explorer should receive national aid. On the 20th of last December I waited upon the Lords of the Admiralty, at the head of a deputation from your Council, and again pressed upon the Government, through the Admiralty, the expediency of making a national effort for the relief of our gallant countryman and his companions. Lord Northbrook fully admitted the claim of our Medallist, and undertook to give the application most careful consideration, before submitting it to the decision of the Government.

In the reply of the First Lord of the Admiralty, dated February 11th, I was informed that, although the Government could not admit, as a general principle, that public funds should be appropriated for the purpose of undertaking the relief of explorers who have embarked upon adventures of discovery upon their own account; yet that they were of opinion that special circumstances existed in the case of Mr. Leigh Smith. These circumstances were held to be his previous services to geographical knowledge in the field of Arctic discovery by expeditions equipped at his own cost, in which he displayed high spirit and good judgment. The Government declined to accept the sole charge and responsibility of a relief expedition; but they undertook

to propose to Parliament, on certain reasonable conditions, a vote of the sum of 5000*l.* towards the expense of sending a privately equipped vessel.

Immediately on the receipt of this reply a special meeting of your Council was called, and it was agreed that our Society should also contribute the sum of 1000*l.* towards the expenses of a private relief expedition. I feel confident that this resolution will receive your cordial approbation.

Thus aided, an expedition equipped at the expense of a member of Mr. Leigh Smith's family, will be despatched in the ensuing season. The whole subject, in all its bearings, has been most carefully considered, and every effort that experience can suggest will be made to bring succour and relief to the missing explorers. Sir Allen Young, ever foremost in such work, has hired the whaler *Hope*, and is busily occupied with all necessary preparations. It may be that the *Eira* has reached winter quarters in some harbour in Franz-Josef Land, and in that case the work of the rescuing party will, though difficult and hazardous, at least be clear. But on the other hand it may be that the missing vessel has been beset, and is drifting in the pack, in which event the efforts of the relief expedition will be surrounded by perplexities. All that human forethought and gallantry can achieve will be done. Of that we may rest assured; and we may still indulge the hope that long before our next anniversary Mr. Leigh Smith and his brave comrades will have been restored to their friends, and have received a warm and hearty welcome from this Society.

The steamer now being equipped for the relief expedition will not be alone in the Barents Sea. The Dutch Arctic Committee has again, for the fifth time, despatched their little vessel the *Willem Barents* with special orders to search for the *Eira* or her boats. Our Associates Sir Henry Gore-Booth and Mr. Grant are also about to undertake a voyage to the edge of the ice in a small vessel named the *Kara*, which is now being fitted out in the London Docks. The Norwegian walrus-hunters will also be requested to look out for retreating boats from the *Eira*, and no chance will be neglected of securing the safety of our missing explorers.

It is with feelings of warm sympathy and regret that I refer to the sad close of the American expedition which left San Francisco, followed by such sanguine hope and good wishes, in 1879. At our meeting of December 12th, 1881, some account was given of the searches for the *Jeannette* by way of Behring Strait, which were undertaken last year, including the complete examination of Wrangel Land by Lieutenant Berry and the officers under his command. It was then announced that your Council had under their consideration the best means of co-operating in the searching operations for the succour of the *Jeannette*; and that I had made proposals on the subject to the Secretary of State

for the Colonies. A very few days afterwards the news of the loss of the vessel in the ice to the north of Siberia, and of the retreat of the crew in three boats to the mouths of the Lena, reached England. The mournful news has since been received that, although one boat's crew had been saved through the skill and able leadership of Mr. Melville, the engineer, the brave commander himself has lost his life, with several of his companions. I am sure that I express the feelings not only of this Meeting, but of all Englishmen, in conveying to Mr. Gordon Bennett, to the survivors of the *Jeannette*, and to the American people, our heartfelt admiration at the heroism and gallantry displayed by the explorers, and our sorrow at the sad conclusion of the expedition. Our brother geographers in the United States will be consoled by the reflection that De Long and his companions have fallen bravely in a noble cause. The chief facts of the disaster, as far as they are at present known, have already appeared in our 'Proceedings.'

The suggestion, originally made by the late Lieutenant Weyprecht, that posts should be established at different points within the Arctic circle for taking simultaneous magnetic and meteorological observations, has at last been adopted and acted upon. The United States have sent out two observing expeditions, one to Lady Franklin Bay, under Lieutenant A. W. Greely, and the other to Point Barrow, under Lieutenant Ray. Russia has also established two stations, at the mouth of the Lena and in Novaya Zemlya. Denmark has sent Commander A. Paulsen to observe at Godhaab, in Greenland. Holland has undertaken the charge of an observatory at Dickson's-haven, near the mouth of the Yenisei. Austro-Hungary has one at Jan Mayen Island, Sweden at Mussel Bay, in Spitzbergen, and Germany in Cumberland Sound (Davis Strait), as well as an Antarctic Station in South Georgia. Our own Government has, I am glad to say, agreed to join the movement, and will establish an observatory at Fort Rae, in the Dominion of Canada. Your Council has contributed instruments to the value of 100*l.*, for the use of Captain Dawson, R.A., who will have charge of the geographical observations.

I cannot conclude this notice of Arctic work without alluding to the plans of Lieutenant Hovgaard, the young Danish officer who came forward as a volunteer for conveying relief to the *Jeannette*, and who read a detailed and interesting statement of his views at our meeting on December 12th, 1881. Lieutenant Hovgaard is now engaged in raising funds for an Arctic expedition to prosecute discoveries in the direction of Cape Chelyuskin. His conviction is that there is land to the northward of that Siberian promontory, and that it is possible to reach it. His zealous efforts have not been without success. He has hired a small vessel, has had her strengthened at Copenhagen, and intends to sail early in July.

In Asia the past year has brought large additions to our geographical

knowledge. I need not here recapitulate what has been done in our Indian Empire, which forms the subject of a special notice appended to this address, the details of which will be found of high interest to all who watch the proceedings of the band of accomplished surveyors who are prosecuting their work in remote parts of our Asiatic possessions. Active explorations have been carried on in other parts of the Continent, and several of our meetings have been occupied in listening to papers on Asiatic subjects by recent travellers. The first of them was in June last, by Colonel C. E. Stewart, who gave us the results of his visit, made in the disguise of an Armenian horse-dealer, to the frontier regions of Khorassan and the Tekke Turkoman country, during which he gleaned a large amount of information regarding the topography of this interesting border-land, as well as of parts of Central Persia through which he travelled on the way thither. By means of his own route-surveys and the diligent collation of the best available materials, he compiled an admirable map of the whole region, which was issued with our 'Proceedings' of September last.

We have also been favoured during the Session with an account of Merv and its neighbourhood by the well-known correspondent of the *Daily News*, Mr. O'Donovan, who, with imminent risk to his life, visited the place, and performed the marvellous feat of ingratiating himself with its truculent inhabitants, and the hardly less marvellous one of escaping from them.

A large portion of this border region, however, still remains almost unknown to geographers, especially the mountainous districts watered by the northern tributaries of the Attrek, and we look forward with keen interest to the joint-survey of the whole line provided for by the recent frontier treaty between Russia and Persia. Meantime the Atok, the fertile strip of territory inhabited by the Akhal Tekke Turkomans at the northern foot of the mountains, which has passed definitely into Russian possession, has been surveyed for railway purposes as far to the east as Sarakhs by M. Lessar, who gave a few weeks ago a brief account of his work to the Russian Geographical Society.

The tract of Central Asia intervening between the Persian and Afghanistan frontiers and the Russian province of Turkistan has been the field of almost continuous exploration by Russian *savans*. The Turkoman desert has been crossed in various directions by intelligent observers, and the steppe-routes from Bokhara and Karshi to the Oxus have been described in great detail by the geographer, Maief. A French expedition, under MM. Bonvalot and Capus, also crossed the desert last spring from Samarkand to the Oxus. The results of the examination of the ancient bed of the Oxus, effected by a commission sent out by the Russian Geographical Society, have also been made known during the year. One item of the highest geographical interest resulting from the report of the Commission is the fact recorded

that some parts of the steppe were found by the engineers to lie below the level of the Caspian. Further east, the Kuldja botanist, Dr. Regel, has been exploring Karategin and Darwaz; while in the mountainous region of the Pamir important work has been accomplished by Severtsof, the eminent geologist so favourably known for his surveys of the Tien Shan some twenty years ago. The results of his researches in the Pamir now published, prove that the famous Bam-i-dunya or roof of the world, is not, as was formerly believed, a region of lofty plateaux, but is broken up into ridges and narrow valleys, the ridges rising from 6000 to 9000 feet above the valleys, and their culminating points reaching in some cases the great height of 25,000 feet above sea-level.

In South-Eastern Asia a valuable contribution towards our knowledge of the upper waters of the Irawadi has been made by Major J. E. Sandeman, whose paper on the subject, followed by the discussion of the revived hypothesis of the connection of the Salween with the Burmese river, occupied one of our recent meetings. The region of the Upper Irawadi is likely soon to become of additional interest to geographers and the public on account of the projected road through it from the Assam Valley to South-Western China, the surveys for which will open up an entirely new tract of country.

With regard to Africa, the past year has offered us no great novelty in the way of explorations on the grand scale to which we have long been accustomed, with the brilliant exception of the journey across the northern part of the continent by the two Italian travellers, Dr. Matteucci and Lient. Massari, which terminated last summer. I have already, in my brief address on the opening of the present Session in November last, given an outline of this striking achievement, and need not further allude to it except to say that we are looking forward with great interest to a detailed narrative of the journey by the survivor of the expedition.

On a smaller scale, explorations have been carried on in many parts with great success, and the area of the unknown, which once occupied the larger portion of that vast continent, is gradually and steadily narrowing.

In North-Eastern Africa two active and intelligent travellers are endeavouring to penetrate the difficult country at present a blank on our maps, which lies between the southern border of Abyssinia and Lake Victoria Nyanza. One of these, Mr. Schuver, a pupil of our science instructor, Mr. Coles, is directing his operations in the north-western part of the area, near the head-waters of the Sobat. He has already made two excursions into the Galla districts south of Fadassi, with good results, and, at the last news, was preparing for a longer journey. The other is Dr. Stecker (the former companion of the celebrated Saharan traveller Gerhard Rohlfs), who has been doing important work in the basin of Lake Tsana, and is planning a journey across the unknown

region southward, towards the Jub. Further south, Mr. J. T. Last, of the Church Missionary Society, has been exploring the Nguru district to the north of the station of Mamboia, and has contributed an excellent paper and map on this hitherto unknown region, together with useful information about the Masai tribe and their country. In the same part of Africa, Mr. Beardall, under the orders of the Sultan of Zanzibar, has explored with good geographical results the course of the Rufigi river. We have also had a valuable contribution to our knowledge of Lake Tanganyika from Mr. E. C. Hore, who has explored that great lake during successive years with great zeal and intelligence.

In Central Africa Dr. Junker, known for his former journey to the west of Albert Nyanza, is now endeavouring to penetrate to the very heart of the continent and, when last heard of, had passed beyond the river Welle of Schweinfurth. The course of this important stream is still one of the unsolved problems of Central Africa, and if it should turn out to be, as some geographers have supposed, a tributary of the Congo, it may eventually be reached and ascended by some of the pioneer parties of our missionary societies, who have reached Stanley Pool and are planning further operations beyond it. Much additional information regarding the lower part of this magnificent river has been given us by Messrs. Crudgington and Bentley, who reached Stanley Pool early last year, travelling by the north bank. Since then another party of the same Society (the Baptist) has reached the same point by the southern bank. Mr. Stanley himself has visited the broad reach named after him, which marks the commencement of navigable waters on the river, and by a series of observations rectified the serious error in the longitude of Stanley Pool in his former map; the true position proving to be a degree further west than originally supposed. The French expedition overland from the Ogowé and Gaboon to the Upper Congo, under M. de Brazza, reinforced by MM. Ballay and Mizon, had not, up to the latest news, reached their destination.

In Eastern Africa a trio of experienced and able travellers, working independently and without knowledge of one another's movements, have been exploring the region lying between Lake Nyassa and the shores of the Indian Ocean south of the Rovuma. These are Mr. Joseph Thomson, the Rev. Chauncy Maples, and Mr. H. E. O'Neill, Consul at Mozambique. Their narratives and maps have been published in our monthly 'Proceedings,' and help materially to fill up the blank which hitherto represented that region on our maps of Africa. Although, however, they have cleared up much that was previously unknown, they have at the same time either revived or suggested problems which are calculated to whet our curiosity. One of these is the persistently reported existence of snow-capped mountains in the interior of this part of the continent, of which full proof is still wanted; and another, the origin of the

Lujende branch of the Rovuma in a lake. Mr. O'Neill's journey carried him within sight of the principal peak, Mount Namuli, that is supposed to reach the snow-line, but an intervening range of lofty eminences, the summits of which were hidden in rain-clouds, was all he could distinguish in the direction of the peak. With regard to the lake, the Rev. W. P. Johnson, in a brief communication to the Society, has stated that he has traced the Lujende to its source in a lake, and the problem now takes the form of whether this sheet of water is the already known Lake Shirwa or is a new lake. So zealous and active an observer as Mr. O'Neill will not, we feel convinced, allow these problems long to remain unsolved.

In other parts of the world, several explorations of more than ordinary interest have been recorded during the year. From South America we have had an admirable account of four years' researches in the Sierra Nevada of Santa Marta by an English traveller, Mr. F. A. A. Simons; and from M. Wiener, a brief account of his journey across the territory of Ecuador and explorations of the tributaries of the Upper Amazons beyond the mouth of the Huallaga; whilst another eminent French traveller, Dr. Crevaux, has added to his former extensive travels in pursuit of scientific knowledge a long journey through the continent, commencing at the La Plata, and passing by one of the less known tributaries of the Paraguay across the watershed into the basin of the Amazons.

In the opposite hemisphere, journeys of limited extent but very considerable interest have been made in the interior of New Guinea, near Port Moresby, by Messrs. Lawes and Chambers, and in Australia much new country has been opened up by the various parties who have been occupied in surveying the route for a proposed trans-continental railway, to connect Brisbane with the shores of the Gulf of Carpentaria, opposite Allen Island. The reports of Mr. J. Robinson, who accompanied General Feilding on one of these surveys, of Mr. R. Watson and Mr. W. E. Armit, speak of the great extent of well-grassed and fertile country explored in the region watered by the many small tributaries of the Cloncurry, the Leichhardt, and other rivers.

Admiralty surveys for the year 1881 have made, as heretofore, steady progress. I am indebted to the Hydrographer, Sir Frederick Evans, for a brief account of much of the work accomplished, the full details of which, with the names of the leading officers engaged, are embodied in a return now annually presented to Parliament, which will, I hope, subsequently appear in our 'Proceedings.'

Surveys are being conducted on the coasts of the United Kingdom; in the Red Sea and Indian Ocean; on the coasts of Borneo, China, and Japan; in Australia, the Fiji Islands, West Indies, and Newfoundland, giving employment, in 1881, to 79 officers and 555 men, distributed among five sloops of war and six smaller vessels.

Among the useful general surveys in China, are the completion of Hainan Strait and the charting of the seaboard of Hainan Island in continuation of an early examination made on its southern coast by the well-known Daniel Ross, of the Indian Marine, in 1802. The delineation of Macclesfield Bank, a submerged atoll reef some 75 miles in length by 37 in breadth, at the entrance of the China Sea. In Borneo, the channel used by the trading steamers when running along the coast between Mallawalle Island (near the north extreme of Borneo) and Sandakan Harbour. In Japan, by a further examination of Tsugar Strait and, in connection therewith, the western coast of Yezo as far north as Cape Ota. In Australia, an exhaustive examination has been made of that part of Torres Strait, now adopted by steam traffic, between Cape York on the east and Booby Island on the west, embracing Prince of Wales Channel. On the shores of Western Australia, Beagle Bay, Port Walcott and its approaches have been charted, and a further diligent search made for the Beaver rock, reported 66 miles seaward from Fremantle, but without finding the danger. In the Indian Ocean, the boundaries and general features of the extensive area of shoal ground, known as the Saya de Malha bank, have been traced out, in continuation of the work originally commenced by the Indian Marine Surveyor, Moresby, in 1837-8. In the Red Sea, the Hanish Islands group have been surveyed, and some progress made in the examination of the shoals of Mocha. In South Africa, at Delagoa Bay, useful additions have been made by the definition of the edges of the Shefeen and Lech reefs, and generally between the Shefeen beacon and Elephant Island. In West Africa, the bars and mouths of the oil rivers, Nun entrance of the Niger, New Calabar, Opobo, and Bonny have been re-surveyed in detail.

The steady perseverance and zeal of the large surveying staff employed by the Admiralty, both at home and abroad, and the intelligence displayed in effectively carrying out their arduous duties, merit the thanks of geographers, not less than of the navigators of all nations who profit by their labours.

The annual addresses of the President have necessarily lost much of their former importance. The monthly publication of the 'Proceedings' during the last three years, containing a chronicle of all the principal geographical events of the year, robs the President's statement of much of its freshness and interest. Shakspere's simile, "As tedious as a twice-told tale," haunts him during the labour of composition, warns him off much interesting ground, and bids him, if he cannot be new, at least be brief. The dryness and brevity of the annual address must not however, for a single moment, be taken as the measure of the living interest in geographical exploration and research. If travellers during the last year have not had the "pride nor ample pinion" of some of their illustrious predecessors, yet in ardour, in intelligence, in knowledge, they do not fall short of them, while in numbers they far exceed

them. And it necessarily follows that while the field of discovery is continually narrowed the growing number of explorers have to contend against ever-increasing bands of competitors, as enthusiastic, fearless, and competent as themselves. But if this fact somewhat diminishes the interest attaching to each individual traveller it adds very sensibly to the completeness and value of their combined researches. The smaller area is more deliberately and thoroughly explored; its mountains, rivers, deserts, climate, and inhabitants are more minutely examined and described, and every year our maps and charts give evidence of increasing care in the record of observations, as old fallacies are exploded, old errors rectified, and additions made to the sum of accurate, trustworthy knowledge. To this work many nations contribute by the genius and perseverance of their worthiest sons. The countries which in recent years almost monopolised the glories of geographical research are now threatened with the honourable rivalry of new aspirants from many lands, and their joint labours promise ere very long to leave "nothing new under the sun." To this Society all are alike welcome, and even if national prejudice should lurk unsuspected among its members, they feel that they cannot more effectually stimulate their countrymen to new and greater exertions than by frankly and cordially acknowledging the merits of their foreign competitors. Long may there be Rohlfs, Serpa Pintos, and Nachtigals to dispute the highest honours we can confer with the Gills, Leigh Smiths, and Kirks of our native land!

OBITUARY FOR THE YEAR 1881-2.

Our losses by death during the year reach the large total of 70 Fellows. Biographical notices of many amongst them who were distinguished as travellers, or for their services to geography, have already appeared in the pages of our monthly 'Proceedings,' and it will suffice here to record their names:—Major S. ANDERSON, R.E., C.M.G.; Mr. DECIMUS BURTON, F.R.S.; Captain HANS BUSE; Vicomte A. DUPRAT; Mr. CHARLES DARWIN, M.A., F.R.S.; Major-General Sir VINCENT EYRE, R.A., K.C.S.I., C.B.; The Rev. RICHARD GRESWELL, F.R.S.; Colonel T. G. GLOVER, R.E.; the Rev. FREDERICK WHITMORE HOLLAND, M.A.; Major-General Sir ROBERT MICHAEL LAFFAN, R.E., K.C.M.G.; and Mr. WILLIAM MAN. Besides the above, our losses include the following, many of whom, though not known as geographers, were distinguished in other walks of life; the names are arranged in alphabetical order:—

Mr. J. P. ATKINS, F.S.A.; Professor ANTONIUS AMEUNEY, F.R.S.; the Right Hon. the Earl of AIRLIE, K.T., who died at Denver city, Colorado, whilst on a visit to America, on the 25th of September last; Mr. WILLIAM ATKINSON, F.L.S., &c., Mr. F. J. ANGIER, the founder, proprietor, and Editor of the *London and China Telegraph*, who died on board the mail-steamer *Clyde* near Aden on his way home from China, on the 20th of December last; Mr. A. H. BARFORD; Mr. HORATIO BEBB; Lieut.-Colonel H. T. BUTLER; Mr. JOHN BIDDULPH; Mr. JOHN GILCHRIST CLARK; Mr. W. H. CLARK; Mr. RAIKES CURRIE, formerly M.P. for Northampton; Mr. E. CLOWES; Mr. R. C. DOWNER; Mr. R. K. DICK (Bengal Civil Service); Mr. M. P. EDGEWORTH (Bengal Civil Service); Mr. H. W. FREEMAN; Mr. G. E. FORBES; Mr. FRANK FITZ-JAMES, C.E.; Mr. J. FORBES-MITCHELL; Mr. RICHARD T. GORE;

Mr. SAMUEL GURNEY, President for 18 years of the Anti-Slavery Society; Mr. WILLIAM H. HODGSON; Mr. JOHN HUNT; Mr. P. L. HENDERSON; Mr. J. W. HUGHES; Mr. JAMES TEBBUTT HALL; Mr. CHARLES HOCKIN, M.A.; Mr. MOUNTNEY JEPHSON; Mr. ANDREW JARDINE; Mr. JOHN LINDESAY KEIR; Mr. H. HAMILTON LINDSAY, M.P. for Sandwich in the years from 1841 to 1847; Captain C. H. LLOYD; Mr. CARLETON L'ESTRANGE; The Right Hon. Sir ROBERT LUSH, the eminent Judge; Mr. JOSEPH ISAAC COHEN DE LISSA; Mr. GEORGE LEEMAN; Mr. ALAN L. M'GAVIN; Mr. ELLIOTT MARTEN (Vice-Consul, Sarawak); Mr. A. H. MOUNSEY, British Minister to the United States of Colombia, who died at Bogota on the 10th of April last. He was the author of two works which entitle him to honourable distinction as an intelligent and observant traveller, viz. A 'Journey through' the Caucasus,' published in 1872, and 'The Satsuma Rebellion,' published in 1879. Mr. JOHN WILLIAM PROUT, M.A.; Mr. WILLIAM PACKE; The Rev. JOHN V. POVAH, M.A.; Mr. R. H. C. PALLETT; Sir THOS. ERSKINE PERRY, the eminent Indian Judge and Member of the Council of India, and for 10 years President of the Indian Board of Education; Mr. DAVID GREIG RUTHERFORD, the naturalist traveller, who had explored various tracts on the West Coast of Africa, and died on Cameroons river; Colonel Sir W. A. ROSE, F.R.S.L., the well-known Alderman and Senior Magistrate for the City of London; Mr. WILLIAM N. RUDGE; Mr. M. B. RENNIE, C.E.; Dr. F. SYMONDS; Captain MARTIN STRATFORD; Mr. G. W. STOW; Mr. GEORGE SEATON; Mr. ALEXANDER STUART; Mr. EDMUND TRIMMER; Mr. HENRY W. WILLOUGHBY; Colonel JOHN WILLIAM WILLOUGHBY-OSBORNE (Madras Army), C.B., who had served throughout the Indian Mutiny, and was appointed Political Resident at Gwalior in 1880; he died at Dehra Doon on the 8th of October last; Mr. JAMES WATSON; the Rev. JOHN DUNDAS WATHERSTON; Captain J. B. WALKER.

Indian Surveys for the year 1880-81.

The year 1880-81 has witnessed the completion of the principal triangulation of all India by the bringing to a close of the last remaining gap in the northern section of the Eastern Sind Meridional series. The triangulation known as the Eastern Frontier Series belongs to a region outside the limits of India proper, and will probably be brought to a close on a base-line of verification in Mergui during the current year. The general outturn of triangulation in 1880-81 was a chain of principal triangles 50 miles in length, and a secondary chain 154 miles long, in Sind; while in Tenasserim observations were taken over a space of about 50 miles, but the triangles will not be completed till next year. The site for a base-line was found with difficulty in a hilly region, so thickly covered with forest growth as Tenasserim, but eventually a suitable one was hit upon in some flat alluvial land in the Mergui township, about three miles long and beyond the range both of the hills and of the creeks which run inland from the sea. In Siam the triangulation has been extended collaterally, and covers altogether an area of about 8000 square miles, including hill peaks on both sides of the head of the Gulf of Siam. The city of Bangkok has been also mapped as well as the chief rivers and canals within the limits of the triangulation, and a route survey was carried by Mr. M'Carthy while accompanying a Siamese telegraphic expedition, from Phra Pratom, the largest pagoda in Siam, up to Natyadoung, a pass on the British frontier. From January to October survey operations in this region are much hindered by a persistent atmospheric haze, but during the cold months it disappears, and due advantage will be taken of this phenomenon in future seasons. The principal triangulation has since entered the complicated system of islands forming the main part of the Mergui Archipelago, where navigation is sometimes tedious and requires care and watchfulness. The

principal inhabitants are the Selung, a small tribe of strange, timid, wild beings, without fixed abode. Out in the Archipelago fleets of their boats may often be seen, but they fly at the sight of strangers. They live almost entirely in their boats, though they make rude shelters ashore, in trees and on poles, during the rainy part of the year.

The Gwalior and Central India Survey, under Major C. Strahan, was occupied on an intricate tract of jungly country in Mewar and adjoining states. The Bhil tribes, who are a wild and uncivilised set, proved tolerably amenable on the whole, though on one occasion they threateningly surrounded a detachment of the surveyors and brandished their weapons in their faces. High cultivation is not practised, but the Bhis are decidedly skilful in laying out small irrigation channels, and the wheat they raise is of a remarkably fine quality. The Khandesh and Bombay Native States Survey party was engaged south of the river Tapti, while the Bhopal and Malwa Survey continued their operations in Partabgarh and Mandisaur. The latter party has surveyed an area of about 24,300 square miles since its first start in 1870, and an area of 4240 square miles remains to be surveyed. In Sylhet great difficulty was experienced from a variety of causes; the country plane-tabled consists of hills, forest, and swamp, with little open ground or clearing; the rivers, lakes, and streams are swollen abnormally during the rains as, for example, the Hakaluki Howhar, which though passable on foot in winter, assumes during the rainy season the dimensions of a lake about twenty miles by nine, where lives are yearly lost, and which is described by local native officials as "that dangerous stormy sea." A third cause of obstruction consisted in the difficulty of procuring coolies and supplies. On several occasions some persons of influence would induce the rice-sellers in the bazaars to refuse to sell to the surveyors' men at any price, and even incite them to riot and violence. Fortunately the principal offender in this way, who was a large land-owner in those parts, took occasion to pay off a spite against a neighbour by breaking into his house and half murdering him and his family, when the civil power took him into safe keeping, and the surveyors, Major W. F. Badgley and his party, had comparative peace. The Rajputana party was occupied partly in the western part of the Jodhpur State, a very desert-like region of Rajputana, and partly in surveying, on a large scale, various tracts in the immediate vicinity of Simla.

The Mysore Survey was commenced in 1875, but the famine seriously interrupted its progress. During the year under review both the triangulation and detail survey were carried on in rugged, jungly, and difficult country. Professional assistance was also rendered by the party to the Commissioners who were engaged in determining the boundary between Mysore and Kanara. Major Strahan believes the commonly received area (27,000 square miles) of Mysore to be considerably below the mark, and estimates the real area to be 30,500 square miles; of this about 17,800 still remain for survey. The southern edge of the country triangulated is skirted by the Bababuden hills and their flanks are a dense mass of impenetrable jungle, chiefly bamboo, inhabited by wild elephants and bison. Most of the country plane-tabled, too, presented equal difficulties. The forests are almost unexplored, and stretch in an unbroken line along the Ghats for scores of miles. Natives are loth to enter, partly from superstition, partly from dread of fever and wild beasts. Supplies are hard to procure, habitations few and far between, and communication difficult across wild and rugged mountains, rising in some places over 6000 feet above the sea. The few open spots met with are generally patches of wet cultivation, deep down in the valleys, from which no points can be seen, and along which it becomes necessary to drag a chain with the chainmen often half-way up to their thighs in mud. A few excellent roads, however, traverse the Ghats, and as long as one's camp remains

on these nothing can be pleasanter than travelling in this region, with a scenery which is probably not to be equalled anywhere in the world.

A useful piece of work was executed by Major Holdich and Messrs. Claudius and McNair towards making a standard topographical survey of the Kohat district and towards completing the gaps between the frontier line and the Kurram valley surveys. The Guzerat survey was carried on under Colonel Leach and Captain Hobday during the absence of Colonel Haig at Venice, where he was acting as one of the delegates on the part of the Indian Government to the Geographical Exhibition. Surveys on three different scales were here carried on, the largest scale being reserved for the Dangs Forest, a malaria-breeding tract, where a good deal of misadventure befell the party, owing to operations having been started in the wrong season, when the grass was dense and high and the country unhealthy.

In Cutch the operations covered firstly a portion of the "Great Runn" and the wide-spreading grass-land known as "Bani," together with the low, well-wooded ground lying to the south and south-east of the town of Lakhpat; secondly, a hilly country intersected by deep ravines and thickly wooded; and lastly the open, well-cultivated ground near the seaboard. The Runn is described as a tract of country without parallel in the whole world. During the dry season it is a sandy desert without a scrap of vegetation, with here and there dangerous bogs and extensive tracts of salt, and during the south-west monsoon an immense shallow inland sea. During the hot weather the hot winds blaze across the Runn like the blast of a furnace while clouds of dust render advance well-nigh impossible; the whole length of the road is marked out by the bones of cattle and camels which have died from exhaustion and thirst, or else from heavy rain-storms, as for instance in April 1881, when the tail end of a cyclone passed over the Runn and caused the death of over a thousand cattle. A curious feature of the Runn is the salt, which is in the form of pure white crystals, very hard and pungent in flavour, and covers many miles of country from two to twelve inches in depth. The mirage is seen to great advantage on the Runn, where it magnifies objects amazingly, so that a water-vessel at the distance of a mile looks like a tree, ten or fifteen feet in height, and the wild ass assumes the proportions of an elephant.

In the Thana and Colaba collectorates operations were impeded by high and difficult hills clothed with forest or by marshy tracts intersected by creeks running in from the sea, while the party suffered a good deal in health. A good outturn of work was rendered in the Sholapur, Kaladgi, and Satara collectorates, and an adjacent portion of the Nizam's dominions, of which no records were forthcoming with the old Hyderabad Survey.

Beyond the Sind frontier surveys were made in Beluchistan, Sewestan, and the Marri Hills. During the hot months of June, July, and August, it is difficult to survey accurately or rapidly on account of the thick muddy state of the atmosphere during the greater part of the time. An area of 3500 square miles was, however, completed, in more or less detail, on the $\frac{1}{2}$ -inch scale, between Quetta and Khelat, while in the north-east of Quetta, inhabited by the Dumar Pathans, which Major Beavan visited under the protection of the chief of the tribe, and in Sewestan, a further area of 2800 square miles was reconnoitred and mapped on the $\frac{1}{2}$ -inch scale. The name Sewestan formerly included a large tract of country, much of which is now in possession of the Marris, and of the Katch Gundava Plain, even as far as Jacobabad and Shikarpur. The Pathan have, however, been forced back by the encroachment of the Biluch tribes, till now Sibi, the capital of the old province, and from which it takes its name, is actually isolated from the remaining portions of its former territory. At the present time Sewestan may be defined in a geographical sense to include all the district drained by the Nari river and its affluents. The

tract is essentially one of rugged, broken ranges of hills, varying in height up to 10,000 feet; sandstone mostly near the plains, changing into limestone formations further back, and running in a general east and west direction. One of the most remarkable features of the country is the Zarghun mountain, the highest in Southern Afghanistan, the culminating point being 11,730 feet above sea-level. It is composed entirely of conglomerate rock, formed of rounded water-worn pebbles firmly cemented together. The upper portions of the hill slope gently inward, but are cracked and divided by the most frightful chasms and precipices that it is possible to conceive. Major Beavan adds that no description could give an idea of the place, but it would not be inaptly represented by some of Gustave Doré's illustrations to the 'Inferno.'

A *mauzawar* or village survey party was occupied in the Dera Ismail Khan and Bannu districts, and cadastral survey parties in Mirzapur, Jaunpur, Ghazipur, and Ballia, in the North-West Provinces, and in the Hanthawaddy, Bassein, and Tharrawaddy districts in British Burma. The work of the Burman surveyors proved to be as good as that of the Hindustanis, and Major Sandeman says it is now proved beyond a doubt that the former make excellent surveyors. Some interesting particulars are given regarding the Karens, who inhabit a portion of the Tharrawaddy district. Mr. Talbot says they generally inhabit lands in the vicinity of the forest which they have reclaimed by their own personal exertions, and that they are as industrious and far more trustworthy than the Burmans. The majority of the Karens met with were of the Christian religion—the Anabaptist persuasion—and the pure simple faith has educated their character far above the average Burman. Mr. Talbot adds that the larger villages boast of a church of their own, which on week-days is utilised as a school-room; the members of the congregation, young and old, assemble for divine service on Sundays, and every night for even-song. The service is conducted by one of the elders, and consists of prayers translated into their mother tongue, and hymns. Secular education is likewise cared for; in fact, in Mr. Talbot's opinion, the Karens are far more advanced than similar village communities in Upper India. Many English tunes are picked up, and passing through a village of an evening, the Karen women may not unfrequently be heard singing such familiar tunes as 'Auld Lang Syne' and the like.

The withdrawal of the British forces from Northern Afghanistan in September 1880 necessitated the return to India of the survey officers employed in that portion of Afghanistan. Thus no fresh information has been obtained in the region around Kabul. But in March 1881 an opportunity was offered of increasing our geographical knowledge of portions of Waziristan situated on the eastern confines of Afghanistan and close to the British districts of Bannu and Dera Ismail Khan, for two expeditionary columns were sent into that country for purposes of retribution and repression necessitated by recent acts of hostility, and survey officers were attached to both columns. One column, under General Gordon, c.b., advanced from Bannu up the Khaisar Valley towards the Razmak plateau, along the northern confines of the Mahsud Waziris, returning through the Shikto Valley to the plains of Bannu. The other column, under Brigadier-General Kennedy, c.b., advanced from Tank into the southern and western Waziri valleys, and then proceeded via Kaniguram to the Razmak plateau, and returned via Palosin to Tank. Major T. H. Holdich, r.e., and Lieutenant the Hon. M. G. Talbot accompanied the first column, and Captain G. W. Martin the second. Through the united exertions of these officers—aided by a native surveyor, Imam Bux, who was taken under tribal protection to tracts inaccessible to Europeans—an area of about 1200 square miles in and around Waziristan was surveyed in more or less detail, filling up blanks in parts of the country which had not been visited since Sir Neville Chamberlain's expedition of

1860, and reaching beyond to regions never yet visited by Europeans. Several mountains on the western frontier were ascended, including the celebrated peaks of Pirghal and Shuidar, 11,000 feet high, which command an extensive view of the region lying to the east, almost up to the Quetta to Ghazni road. Though the movements of the surveyors were hurried so as to keep up with the military forces, the atmospheric conditions were favourable, enabling points to be fixed by triangulation up to a distance of 200 miles. A great deal of information has been obtained which, when combined with a recent rough reconnaissance of the Zhob valley and the upper branches of the Gomul valley towards the Ab-i-Istada valley by a native explorer, will go far towards filling in the blanks in the maps of that region. The British forces were not withdrawn from Southern Afghanistan until April 1881. Meanwhile Colonel E. P. Leach and Lieutenants Talbot and Longe completed some triangulation around and to the north and west of Kandahar, and extended towards the Hazara country the survey of the Kakrez valley previously made by Captain Hobday, and also added to the survey of the Argandab valley. A survey of Kandahar and the surrounding country was also made by a native surveyor on the scale of six inches to the mile.

It is noteworthy that during the occupation of Afghanistan by British troops, from the invasion thereof in 1878 up to its evacuation last year, an area of 39,500 square miles has been surveyed in more or less detail in various parts, and a further area of about 7000 square miles has been explored by native agency. An important result of these surveys is to show that the position of Kabul, Ghazni, and Kandahar, as indicated on the maps completed after the first Afghan war, are correct in latitude, but erroneous in longitude by 10 to 14 miles, and that they all require to be shifted to the east, bringing them so much nearer to the British frontier. Also a large number of heights which are entered on those maps are considerably in excess of the truth. They appear to have been mainly derived from barometric observations taken by the well-known Asiatic traveller, Dr. William Griffiths, whose skill and accuracy as an observer were eminent and unquestionable, but who, unhappily, did not live to reduce his own observations, and did not take account, in his method of reduction, of the hourly, daily, and monthly variations of barometric pressure, the neglect of which is liable to affect the results very materially. The general result is, therefore, to lower previous estimates of the height of Afghanistan about Kabul, including some peaks of the Hindu Kush, by about 500 feet.

Although at the outset of the Afghan survey operations a well-connected series of triangles between India and Kabul was hardly thought of, either along the line of the Khyber or the Kurram, yet results show that it is only by the want of observations at a very few points that the final triangulation fails to realise this. A valuable point of connection between the two series has been the Sikaram peak of the Sufed Koh range, which is common to both, and which is also one of the most strongly fixed of all the Great Trigonometrical trans-frontier peaks in this neighbourhood. The connection of the two series was effected by Colonel Woodthorpe, who succeeded in reaching one of the peaks overlooking the Kabul plain, which had been fixed but not visited by Major Strahan.

The exploration referred to above by the native surveyor of the country between the Suliman range and lake Ab-i-Istada covers an area of about 7140 square miles. The account includes some noteworthy particulars of the tribes inhabiting that (hitherto) blank region on our maps lying between the country of the Waziris and Pishin. The Sheranuis are a powerful tribe occupying a hilly tract of country south of Waziristan and west of the well-known peak Takht-i-Suliman. Their principal villages are Drajan, Pasta, and Karam, and most of the other inhabitants live in small square forts with towers at the angles. Hindu traders are found in the villages,

also blacksmiths, carpenters, durry makers, weavers, and barbers. The Takht-i-Suliman proper is a niche in a rock about 10 feet below the summit, looking as if it had been cut out by hand, and in front a small ledge, below which the mountain falls precipitously. The legend is that King Solomon used to cause himself to be transported by genii to this place and sit there to enjoy the cool air. There is a shrine on the summit, and many pilgrims visit the place, which is approached by a steep and difficult path.

Colonel H. C. B. Tanner's description of the operations about Gilgit shows that all the passes leading across the watershed between Gilgit and the Indus have been mapped, and the two most important ones which have been used of late years by Kashmir troops have been visited. A good deal of topography has been accomplished in other parts of this section of the Indus basin, and Colonel Tanner anticipates that the subsequent work of the current year will have furnished us with a reliable record of every pass marching with the boundary of British and Kashmir territory on the one side, and the country of the independent tribes of the Indus on the other, for a distance of over 200 miles, from Gilgit, in the extreme north-west, to Amb, in the Hazara district of the Punjab.

The work at the headquarters offices in Calcutta, where the various laborious operations of drawing, compiling, and examining go on, as well as the work of reproduction through lithography, copper-plate engraving, and the different photographic processes, displays the same unremitting activity that ever characterises this important branch of the Survey Department. The Mathematical Instrument Department, which is charged with the important function of supplying the wants of the Marine and Land Survey, the Public Works, Military, and other Government Departments, show a good record of work done, and the Great Trigonometrical Survey Office has been likewise indefatigable in its varied duties, which include the preparation of a fifth edition of Walker's *Turkistan*, by far the best map of Central Asia attainable in this or any other country. The two last matters calling for notice in connection with the Indian Survey are the establishment of various fresh stations for tidal observation, by which the number of these points along the Indian coast is now nineteen in all, and the kindred work of spirit-levelling by which the opposite localities of Madras and Bombay have been connected by lines of levels carried right across the peninsula of India.

Merv and its Surroundings. By EDMOND O'DONOVAN.

(A Lecture delivered at the Evening Meeting, March 27th, 1882.)

MR. O'DONOVAN spoke as follows:—

As the President has told you, the subject of my lecture this evening is Merv and its immediate surroundings. I have much to say about portions of the Caspian coast westward of Merv, but the time allotted to me will not permit entering into details on that part of my travels. I shall simply preface what I have to say about Merv by noticing the circumstances which brought me there. I had been detailed on an exploring expedition to Central Tibet, and while passing through the Trans-Caucasus I learned that an expedition was being fitted out against the Turkomans. It was deemed advisable that I should go with it. I was attached to the expedition under General Lazareff, and accom-

panied it for about 200 miles ; but on his death and the advent to power of General Turgukasoff, objection was raised to my presence, and I fled at night across the frontier and gained Persian territory at Astrabad. I subsequently went to Gumush Tepé, on the Giurgan, staying in the same house that Vambéry occupied. Then I crossed over to the Akhal Tekke frontier, but I found that the way was blocked to me, the Russian authorities wishing to prevent me, as an Englishman, from witnessing operations which they desired to keep secret. I had to contend not only with the natural obstacles of the country, but with a very well-managed political opposition. Still I managed to get to Merv.

When I commenced my ride to Merv I was on the extreme north-eastern frontier of Persia at Kelat-i-Nadiri. From there I made my start across to Merv. I knew that I should be obliged to have recourse to a *ruse de guerre* in order to pass the lines, for the Prime Minister of the Shah had given very strict orders that I should not be allowed to join the Turkoman ranks. I pretended to visit the town of Kahka, giving out that that was my only object. I found a Russian agent there who had sufficient influence over my escort to induce them to lay down their arms and refuse to accompany me. I then simply rode out of the town, pretending to be about to return to Kelat-i-Nadiri, whence I had started, but when once out of sight of Kahka, I turned due east, not knowing what was to happen to me, but I was determined to get to Merv or to perish in the attempt. Fortune favoured me. I reached Mēhna where there is an outlying colony of Tekke Turkomans from Merv, who are nominally paying tribute to Persia, but who are really independent. They received me very well, but they were not quite sure that I was not a Russian. They knew that Skobeleff was close by, and they were not without doubts that I was a forward agent, but still they allowed me to accompany them to their permanent home at Merv. With them I crossed the Tejend river. You have so often heard of the desert in connection with this ground that you are apt to imagine it is one of those sandy, stony wastes, such as you read of in Central Africa and in different parts of Northern Asia. It is no such thing. The country is perfectly fertile, it is only desert through want of water, and notwithstanding that want of water occasional rains produce a herbage which is quite sufficient for the maintenance of camel trains passing through it. Neither is it correct to say that Merv is the only fertile spot of earth in the midst of this desert. It would be simply necessary to construct a proper series of dams on the Murghab and Tejend rivers, and adopt a scientific system of irrigation, and the desert would become fertile again.

The distance from Mēhna to Merv is about 120 miles, and as our supply of water was carried in goat-skins upon our saddles, we had to make haste and do the distance in twenty hours. Nothing but Turkoman horses could have done that without water, for I need not tell you, horses

could not be made to drink from leather bags. It is true we came upon a very deep well at Shaitli (Sháhídlí), about half-way between the Tejend and Merv, but the water there was so mixed with nitrate and chloride of sodium that the horses, though they were thirsty, refused to drink it. The only way in which we could get at it was by lowering a nose-bag into the water and hauling it up as quick as we could. But half the water at least ran through the camel-hair texture, and the horses would not look at it.

Late at night we camped in a wood. My companions told me that they were afraid of robbers; I thought this rather peculiar, inasmuch as I was with the most select party of thieves it was possible to find. It reminded me of Gautier's experience in Spain, taking robbers with you to avoid meeting them on the road. While we slept, what is not usual to the desert took place—a tremendous shower of rain commenced falling, and it was nearly four in the morning before we resumed our march. After a couple of hours we arrived at the old caravanseraí of Dash Robot. It is a very extensive establishment indeed, but now inhabited only by jackals and wolves. We remained there for an hour, wringing our garments under the groined arches of the building, once erected by the old authorities of Merv for the service of the caravans that plied in those days between Persia and other parts of Asia. I was then within four hours' ride of Merv, and after the time that I had been waiting, I need not tell you that, however dangerous it was, I was glad to get on there. We continued our journey, and at last began to perceive beehive-like houses. I was not quite sure, after all I had heard of Merv, whether I should not see domes and spires flashing in the amber sunset; but instead of this I found some wretched hovels, sheepskin-clothed people, and half-starved cattle feeding in a bog. As I had an overcoat on and an umbrella, I was immediately seized upon as something new and suspicious, and it was taken for granted that I was a Russian spy. I was taken to the capital.

And now let me pause to dispel a delusion that has existed for a long time, namely, that Merv is a great Asiatic city, the possession of which would make the fortune of the possessor at the present time. There is no such city as Merv. Merv is only a "geographical expression." It means a certain amount of cultivated territory where half a million Tekke-Turkomans manage to eke out an existence by pastoral pursuits, plunder, and thievery, combined with the caravan service between Bokhara and Meshed. There is no central point which you can call Merv now, if I except the place which has grown into existence since my arrival. I speak of Koushid Khan Kala, a fort at a point on the river Murghab which, flowing from the Afghan mountains, loses itself in the desert before it reaches the Oxus, and where the Tekke Turkomans think they can oppose the onward approach of the Russians.

The Murghab river forms a loop to the westward, and in the curve of the loop is an immense fortress, constructed within the few months I was there, over $1\frac{3}{4}$ miles in length and three-quarters of a mile in breadth. It is entirely of earth. The ramparts are 40 feet in vertical height and 60 feet in base, deeply reveted on the exterior slope. It is intended that when the Russians attack the place, the entire population shall retire within the walls and there make a desperate fight as they did at Geok Tepé a short time ago. Between the walls of this fortress and the river there are a thousand Turkoman huts, and that is all there is of a central Merv at the present time. Later on I had to visit the ruins of the reputed Alexandrine town and of the Mussulman one. The ruins lay 25 miles to the east of the present central position. They are entirely deserted, but they show traces of a very high degree of civilisation. The old fort, the Fort of the Unbelievers, as the present Turkomans call it, was one doubtless which Alexander looked upon when he passed through these parts, as the people here say he did, and not very far from the walls is an extensive ruined earthwork, still called the Fort of Iskander, where his army is supposed to have encamped. At present it is like an immense railway embankment running around a quadrangular space some 900 yards on each side. In the midst are traces of houses, broken pottery, and shattered bricks. On the table you will see one of the bricks which I brought from the place. It is enamelled blue, and marks one of the old civilisations, I should say shortly after the time of Alexander. Here also is a bronze lamp. At one period it was damaged, and repaired with gold; and at another time, probably during the reign of Genghis Khan, it was mended with sheet iron. This was given to me as a curiosity by a Turkoman. This old town was destroyed in A.D. 666, and the Arabs, under the lieutenants of Omar, the fourth Caliph after Mahommed, built a town now known as Sultan Sanjar, only a thousand yards or so distant, for in the idea of those people it is unlucky to occupy the site of a former town.

I may perhaps remind you that the old Margiana, Merv as the Persians and ourselves call it to-day, Merou as the Turks call it, is the scene of Moore's 'Veiled Prophet of Khorassan,' and it is inside these walls that Mokanna is supposed to have held his own against the Mahommedans for such a long time.

The town of Sultan Sanjar which stands close by, and of which the towers are still extant, is about 600 yards square. The space within is one mass of crumbling ruins and broken bricks, but in its midst stands a most elaborately constructed tall tomb, under which the bones of the sultan after whom it is called are supposed to lie. The Turkomans consider he was a very holy man indeed, and I had a curious example of the estimation in which he is held as I rode away from the place after examining it. Some two miles from it are two large heaps of brick and stone, which the Turkomans who escorted me said were erected

over the remains of two enemies of Sultan Sanjar; every man who had a loaded musket rushed by and discharged it at the rude pile, and those who had not threw stones with vigour against it. Who these buried men were I do not know; but the incident shows how far tradition will carry people who have no literature. To the south-west is the newest city of Merv, that which existed up to ninety-nine years ago; but which was overthrown by the founder of the present Bokharian family. It was defended by Bairam Ali, and has retained his name since. It is now a heap of melancholy ruins. There are remains of baths, and palaces, and ramparts crumbling around, with nothing living but snakes and jackals to be seen, or perhaps some wandering Turkoman looking out for his sheep; and he is perhaps the most dangerous animal to be encountered among the ruins. This is all that remains of Merv—three absolute ruins; the only central point is such as I have described to you. Merv itself is an oasis peopled by half a million of agricultural semi-nomad people. They acknowledge allegiance to no one except to the Sultan of Turkey; and as they once did me the honour to ask me to represent them in a general way on my return to Europe, they told me to assure the Sultan of Turkey that they would acknowledge no sovereign save him, and they greatly wondered why he had not before this sent several army corps to their relief against the Russians. When my predecessors in Merv travel reached the oasis—General Abbott, Mr. Taylor Thomson, Burnes, and others—Merv was under the jurisdiction of Khiva, and the administrative centre was Porsa Kala, at the point where the dam renders the oasis fertile. It is now a howling waste of mud ruins, uninhabited even by nomad Turkomans. For some inexplicable reason the Tekke Turkomans have removed their stronghold some 25 miles to the northward; and though I over and over again told them that their present position was useless, I could not persuade them to listen to me. Across the river is built a dam. The river is 80 yards wide and not fordable, owing to the artificial rise of level above the dam. The water, by means of the dam, is raised to a level which makes it flow over the adjoining country; and if an enemy took possession of the dam and broke it down, the whole country would become utterly barren, after a few months at least, and those holding the central stronghold would be forced to surrender. I had a very curious opportunity of seeing how this dam worked. Though there is but very little central administration at Merv, there is sufficient to tell off 700 men for the care of this dam when the melting of the snows of the Afghan mountains causes the water to rise in the Upper Murghab. There is a narrow sluice which is lined with fascines of giant reeds; but so great is the current flowing through, some 10 feet in breadth, that it requires a constant attention to those fascines to prevent the water tearing them away. The difference between the level of the water on the Upper Murghab and on the Lower is about 7 feet; and that is sufficient to

destroy any ordinary earthwork, unless constantly attended to, and the reed facing kept in constant repair. Close by are the ruins of Porsa Kala, as I have already said.

I will now return to Merv. One of the most peculiar sights to be seen there is the trophies of the victory of the people over the old Persian expedition some twenty-three or twenty-four years ago. Close by where I lived there were some thirty-six cannon, mostly of bronze. Twenty-six of them had been taken from the Persians, and the remainder from the Afghans and Bokharians. The guns are good enough, but the carriages are entirely rotten; and one of the severest trials to which I was put was to reconstruct some of these carriages and to find shot for them, because from Merv to the Caspian you could not find a pebble as big as an ordinary cockle-shell. I asked them why they depended upon these cannon, and one of them told me, "There are old men amongst us who witnessed the Persian artillery fire, and they know where the shots fell, and at any moment we could dig the shots up and fire them back again." I was surprised at that, because the Tekke Turkomans are people who have a practical and every-day acquaintance with warfare. Still, they always think that the Russians will some day come rushing at their earthworks, and that they will be behind them.

I do not care to enter into politics, but I shall have to say something about the strategy of the situation as regards the military position in Central Asia. The Turkomans of Merv have only been twenty-six years in the oasis. They formerly inhabited the district around Sarakhs on the upper part of the Tejend river. They were driven from there twenty-seven years ago by the Persians, who objected to the neighbourhood of persons so disagreeable as to insist in carrying off Persian men, their wives, and daughters, and selling them at 5*l.* per head in Bokhara. The Tekke Turkomans finding themselves without pasturage, turned round on the Saruk Turkomans and drove them up the river towards Afghanistan and occupied their territory. The present Tekke Turkomans, therefore, have only been twenty-six or twenty-seven years at the outside in their present situation; and I am the first European who has visited the oasis since the arrival of this particular population. They are divided into two great divisions, those to the eastward, who are styled the Toktamish, and those to the westward, who are called the Otamish. Those two divisions are governed by hereditary khans. Four years ago there was one great chief, Koushid Khan, after whom the central fort is named, who had unified both parties; now his son Baba Khan is chief of the Eastern Turkomans, and a gentleman named Aman Niaz Khan is chief of the Western Turkomans. These two great divisions are, each, further subdivided into two others. The eastern division is divided into Beg and Vekil, of the former of which Baba Khan is a member. On the western bank of the river the Otamish are divided into Bukshih, who live along the river, and

Sitchmaz who are further removed from it. Besides these divisions there are six others, so that there are twenty-four yaps or divisions, and each is governed by an elder or magistrate, called a *kethkoda*, and the union of these elders, superintended by the chiefs, constitutes the council which decides the military movements of the Tekke Turkomans.

I have anticipated my subject in order that you may have a thorough understanding of what I am going to say to you. When I arrived in Merv, and was still a prisoner suspected of being a Russian advance agent, I had a visit from Tokmé Serdar, who defended Geok Tepé against the Russians most successfully two years and a half ago. Defeated, he fled to Merv for protection. He called on me and asked what I thought of the present situation. I told him pretty frankly that I believed the Russians were masters of the Akhal Tekke. He said, "Do you think I ought not to surrender myself?" I said, "That is a question for you." He said, "The Russians are three days' march off, but the English are twelve days' march, and supposing they were both to advance simultaneously, who will arrive first?—the Russians; and we will then surrender to the first." That was a military man's opinion and I really believe, from my knowledge of Central Asian populations, that he was quite right. I was brought before the Council of Merv to explain myself. I produced my English passport and my passport from the Persian Government at Teheran; but as very few of them could read Persian, much less English, there was still great doubt as to whether I was a Russian or not. One of them said I was a "Yellow Russian." They divide all Europeans into two kinds—"Yellow" Russians and "Black" Russians. The "Yellow" Russians are Russians, and the "Black" Russians, those to whom I have the honour to belong. Some of them have seen dark-skinned sepoys, and that is the nationality to which we are supposed to belong.

At length, after a month's detention, letters arrived from the minister at Teheran, assuring them that I was a black Russian and not a yellow one, and accordingly I was set at liberty, and a revulsion set in in my favour. It was believed I was a political agent sent there; and thereupon the existing Khan was dethroned, for reasons I shall give presently. The manner in which he came to the throne is very characteristic of Central Asia. When there were rumours of the threatened Russian invasion of the Akhal Tekke along the slopes of the mountains, the Shah of Persia requested the Tekke Turkomans to send their representative agents to Teheran in order that he might discuss with them certain measures of defence. The two hereditary khans declined that office, for so many had been summoned to Teheran and had not come back again, that they did not wish to repeat the experiment. They consequently fixed upon a very useless old person called Kadjar Khan, and retiring themselves from power, elected him to the supreme dignity, sending him to Teheran to do what he could, or,

failing to do anything, to remain there if he wished. Finding that I was not a yellow Russian, and thinking some money might be going about the place, they thought it best to resume their old position, and so they dethroned old Kadjar Khan. As neither of them could agree with the other, they resolved to associate a third person with themselves, and they did me the honour of electing me to the triumvirate. This was a very delicate compliment to me. It was intended as a reparation for the *duress* in which I had been kept, and also because they firmly believed that the English troops having marched to Kandahar were coming to Herat and thence to Merv to drive the Russians back to the Caspian. Notwithstanding all my assurance to the contrary, they thought it was only an assumed modesty on my part, and hence they elected me; and on my finger I wear the inaugural ring which was placed there when I was elevated to the office.

All this time a very curious correspondence was going on between these gentlemen and the embassy at Teheran and the Foreign Office in London, which shows how very capable of duplicity these same gentlemen are, even if anybody doubted their capacity in this respect, which I do not.

I may now simply give a history of my stay in Merv before I enter into any anecdotes of their method of life or the various every-day events which happened to me there. The moment arrived when I thought it would be to my interest to withdraw from Merv. I had been appointed one of a triumvirate—its president; and over my house floated the banner which indicated that I was the commanding khan. Guns had been fired in my honour; servants were at my disposal by the legion; but still, I did not feel easy. I knew they were counting on the arrival of British troops from Herat, that they were counting upon moral, if not physical, support against the invading armies, and that all my popularity and success was based on that hypothesis, and I knew that, with the breaking down of the delusion, all my popularity would cease. Judge then of my horror when I learned it was decided that within two months Kandahar should be evacuated. I immediately took measures to evacuate Merv. This was not so easy as it might seem at first sight. They had attached such a high importance to me, that it was not easy to get them to part company with me. By an extraordinary chance, just as the Russians had taken Geok Tepé, otherwise called Yengi Sheher, I arrived at Merv, and there and then Skobelev halted his troops at Askabad. The events were synchronous; but the Turkomans set them down as the consequence the one of the other—that because I came to Merv the Russians had halted; and they drew another conclusion, that if I went away the Russians would come on again. Therefore they were determined to hold me as a kind of palladium at any price, or as a hostage. Perhaps one of the most curious illustrations I can give of the ideas they formed was the fact

that they brought me all kinds of strips of cloth and asked me to manufacture a Union Jack to be hoisted in the centre of the fortress. I declined the task. Then a chief came to me and asked me about the English cavalry, and whether the horses were marked. I said they were; and he asked me if I would draw him a diagram of the brand on the cavalry horses. I drew "V.R." with a crown. He immediately snatched the paper up lest I should repent of having given him the design, and having caused a brand to be made on its pattern, commenced branding all the horses, so that if the Russians came they would be able to state that they were English horses; but the funniest part of it was that the brand bore a direct "V.R."; and you will see the horses in Merv to-day with "R.V.," and the crown very often turned upside down. At all events, I deemed it wise to evacuate Merv myself, and I told them that a new frontier was being decided upon, that the Russians claimed Sarakhs, and that the Turkomans would be cut off from the rest of the world and placed between two fires,—cut off from Herat and every other point that they had hitherto been supplied from. I asked them if they were prepared to send a representative to the council at Meshed, a council which existed only in my own imagination. They considered seriously, and they asked whether the members of the council could speak Turkoman. I said, "Certainly not; only European languages." They said, "Are you prepared to represent us on that council?" I pretended to hesitate. I said, "It would be dangerous for me to leave Merv at present, as the Russians might catch me; but if you wish it, in your service I will risk my life and go to Meshed." Accordingly, with a nominal escort of 50 horsemen, but which swelled to 150 before leaving the precincts of Merv, I left for Meshed. That is the story of my leaving Merv, and it is very lucky I left it, for within a very short time afterwards the news came of the evacuation of Candahar, and we know now that the Russian caravans are plying freely to Merv.

I have as briefly as I could within the time allotted to me sketched out to you the circumstances of modern Merv, and the peculiar situation in which she finds herself at present. It is forbidden by the rules of the Royal Geographical Society to enter into political questions, but I think that strategical ones are not considered out of place on an occasion like this. It might be that the Khan of Khiva or Bokhara may try to invade India, and it would be just as well if I should mention the circumstances which would enable the Khan of Bokhara to take possession of Afghanistan if he tried. A great deal has been said about a foreign enemy occupying Merv with a view to attack Herat, as the Persians did some thirty-nine or forty years ago. Now supposing that enemy came from the direction of the Caspian, advanced along the mountains, and struck upon the Tejend river, he would find along its banks a large supply of forage. I have seen hundreds of tons of

tree trunks stranded on its shores; there is a large mass of reeds and canes, and the water is excellent. Wood, forage, and water are some of the greatest requirements of an army, and the banks of the Tejend have all that. That river leads directly to the walls of Herat itself. There is no necessity whatever to go to Merv. It would be going around the two sides of a triangle instead of the hypotenuse, and the only object of going there would be to secure either its friendship or its submission. Merv contains a population of 500,000, out of which at least 70,000 horsemen could be raised, and those 70,000 acting on the flank of a line of communications could do immense injury to an army trying to advance along the line of the Tejend. Should anybody want to go to Merv at present, it must be with a view of securing their friendship, their neutrality, or their submission, as the case may be. So much for the military question.

Again, Merv and the Turkoman country generally, lying between the Oxus and the Caspian, has hitherto represented in the Central Asian mind all that was free, independent, and unconquerable, and the moment that a fragment of that independence is brought under the control of one nation or another, the whole of Central Asia is on the side of the conqueror. Those are my strategical views on the subject. They are my honest appreciations of the situation, and who shall say whether the conquest of Merv be for the better or for the worse, whether it be in the interests of civilisation or not. For my part I cannot forget the fact that it is not so many years ago that the Muscovite arms arrived at Khiva and Bokhara, and sent back 40,000 Persian captives to their homes who had long pined in captivity there. This was one great step in progress, something that had never been heard of before perhaps in the whole of Central Asian history; and if to-day these devastating Turkomans are wiped out by some who perhaps are not as liberal as we should be, who shall say whether it is not for the better?

The PRESIDENT, in introducing the lecturer to the Meeting, said the unusually large attendance that evening showed how widely Mr. O'Donovan's most interesting articles in the *Daily News* had been read by the English public, and how well they had been appreciated. Those who were present on the 27th June last, when Colonel Stewart read his important paper on the borders of the Turkoman country, and the tribes of the district, would recollect that he spoke of having met Mr. O'Donovan on more than one occasion, and that he succeeded in impressing him with the belief that he was an Armenian horse-dealer. Colonel Stewart told them that Mr. O'Donovan was, at the time he was reading his paper, shut up in Merv, but that his knowledge of his character enabled him to prophesy that he would keep himself safe while there, and contrive to leave it at the proper moment. He was happy to say that both those prophecies had been fulfilled, though the risks were greater than Colonel Stewart probably expected. However, Mr. O'Donovan was now present to speak for himself. In the hour allotted to him for his address, he could mention only a very small portion of his experience, but they would all be glad to hear that he was engaged in writing for the general public a full record of his strange adventures.

After the reading of the paper—

Sir HENRY RAWLINSON said that he was afraid that any observations he could offer would fall very flat after the graphic and interesting lecture which had been addressed to them by Mr. O'Donovan. Having moreover, on two previous occasions in that theatre, and before the same audience, said all he had to say of any consequence upon Merv, he was rather at a loss to make further remarks on the subject. He was far from impugning Mr. O'Donovan's accuracy; in fact his descriptions had been singularly faithful and graphic; but there were a few points on which he thought explanation was desirable. Mr. O'Donovan had informed them, no doubt to the astonishment of many, that what was called the Desert of Merv, was really no desert at all; that it was merely a dry, hard, alluvial plain; but it would have added to the force of his description if he had stated that that was the physical characteristic of the country only as far as the Murghab, beyond which there really was a sandy desert. The explanation of this physical distinction was curious. In very early historic times the so-called desert of Merv was the garden of the East. A large branch of the Oxus, probably three-quarters of the volume of the river, flowed through it, and it was only in consequence of the course of the river being turned to the north that the vast alluvial plain he was describing had become a desert. The old bed of the river was still to be seen. It ran through the Turkoman desert, absorbing the Murghab and the Tejend, and so on to the Caspian. Classical scholars might remember that Herodotus gave a very curious account of a great reservoir called *Ακίς* (iii. c. 117) at a point a little to the north-west of Merv.* There really did seem to have been a great central lake in those days, fed by the Oxus, the Murghab and the Tejend, and supplied with sluices through which water was distributed over the face of the plain. The cultivation was enormous, and owing to the fertility of the soil and the admirable climate, the products were most abundant. Pliny, indeed, stated that the district of Darefium in Apavortene (or Abiverd), eastward of the Caspii, was the most fertile part of Asia. In former times also it must be remembered that the high road to Merv ran from the south of the Caspian to Askabad, and so on by Abiverd, north of the mountains; and if water were supplied to the desert at the present day the hard, dry, alluvial soil would again become fertile. He did not wish to be hypercritical, but in one or two points he must correct Mr. O'Donovan. In the first place, Alexander did not visit Merv in his march eastward; in fact, the nearest point to it at which he passed was a long way to the south. After the death of Bessus in Parthia he went straight to Zarangia (or Seistan) by Susa and Artacoana (Zuzen and Káin), and never approached the district in which Merv was situated. It was also entirely a poetical licence to speak of the death of the Veiled Prophet as having taken place at Merv. Moore might have made it so, but the real tragedy took place at Siyám in the hills bounding the plain of Kesh, on the other side of the Oxus, where the Russian and Bokharian frontiers now meet. With regard to previous travellers who had been at Merv, it should be noted that Sir Alexander Burnes, Stirling, General Abbott, Shakespeare, Sir Taylor Thomson, Wolff, and more recently a Frenchman, Bloqueville, had all been there, but he doubted if any of them had obtained so good a knowledge of the country and the peculiarities of the people, both ethnographically and politically, as Mr. O'Donovan. Mr. O'Donovan had reminded them that they were not allowed at the Geographical

* The five nations who dwell upon the Aces and received its water are stated by Herodotus to have been the Chorasmiens, Hyrcanians, Parthians, Sarangians, and Thaminæans, all of whom are connected with the Oxus, Ochus, and Heri-rud or Tejend. Aces is probably the same word as Ochus, and may be the original of the modern *Oguez*, by which name the river-bed is now known.

Society to plunge into politics, and therefore he had spoken only of "strategics." He (Sir Henry) would follow his example. The public generally should be brought to look with care at the relative positions of two great European powers in regard to the line between the Caspian and India. Mr. O'Donovan had very truly said that there was no necessity to attribute hostile views to the Russian Government. They certainly had greatly benefited civilisation in curbing the Turkomans, and generally their government in Khiva, in Samarkand, and in Khojend had been very superior to that which previously existed there. But at the same time politicians could not be guided exclusively by humanitarian considerations. They had to look mainly after national interests, so that it was quite legitimate for Englishmen to watch the Russian movements with interest and vigilance. From the Caspian to the Indus it so happened that Herat was as nearly as possible the half-way house, 800 miles from each end. From Askabad, the Russian centre, to the Caspian was 400 miles, and the same distance to Herat. On the English side from the Indus to Candahar was also 400 miles; and as the Russians had run a line of railway from Krasnovodsk to Kasil-Arvat, so the English had run a line from the banks of the Indus to Sibi. But there the parallel stopped, for if Russia were to continue her railway to Sarakhs as was generally expected, and the English were to continue theirs to Candahar, the former country would have a very great advantage, the distance from Sarakhs to Herat being only 250 miles, whereas from Candahar to Herat the distance was nearly 400 miles. These were interesting points in strategical geography, and it was just as well to keep them in mind.

Sir Henry then pointed out on the wall-map hung for the illustration of the lecture the probable line of the Russian advance, observing that although a direct march along the Atok from Askabad to Sarakhs would traverse Persian territory, and could not therefore be undertaken without some special diplomatic arrangement, yet Russia would always have the power of advancing by the line of the Tejend, which was beyond the Persian jurisdiction. If Russia indeed desired to advance by that line he did not see that there were any strategic means of stopping her, and from the Tejend she would only have to follow up the stream to reach the walls of Herat. He was now referring to military possibilities, not to any immediate intention to carry the scheme into execution. He did not indeed believe that there was any such intention at present. At the same time it was worth observing that in history there had never been any high road up the Tejend to Herat. Armies had always marched across to that city from Nishapur. He did not know whether Mr. O'Donovan had obtained any information in regard to that line of country, but he himself had not been able to find any trace of a route up the Tejend from Sarakhs; there was no route indeed from Sarakhs to the south given in the old geographies, except one which clung to the hills skirting the desert, till it crossed the Murghab at Merv-el-Rûd, and then continued along the hills by Talikhan and Faryab to Mymeneh and Balkh. Mr. O'Donovan had mentioned the city of Sultan Sanjar. From about the year 800 to 1200 A.D. was the culminating period of Merv's populousness and glory. Sultan Sanjar, of the old Seljukian dynasty of Togrel Beg, who lived between 1000 and 1100, fixed his capital at Merv. He was buried there, and his tomb was still one of the great places of pilgrimage. Merv continued in a flourishing condition until the time of Jenghis Khan, who destroyed the city. It was believed that 4,000,000 persons were killed at Merv, Nishapur, Balkh, and Herat, the loss in Merv alone being estimated at 1,000,000.

Colonel ST. JOHN said he had never been within 600 miles of Merv, but it was his good fortune some eight or nine years ago to be employed in making a map of Persia, and at that time had learned a good deal about those countries; his information, however, had since been greatly supplemented by the travels of Major George

Napier and others. He thought that Mr. O'Donovan undervalued the purely strategical situation of Merv. A great range of mountains extended from the Caspian to China, dividing northern from southern Asia in a very marked manner. For countless ages it had been the great boundary between Aryan and Turanian. There was one gap in those mountains, and that was defended by Merv. The two rivers, the Murghab and the Tejend, ran through the gap, and there always had been a city of great importance somewhere in the neighbourhood of Meshed, and on the other side there was Herat. Those were the two fortresses protecting the rear of the situation, while Merv was the advanced post. While those three positions were held in force by any strong power no invasion from Northern Asia could be possible. When Merv had been forced it had always been from the Oxus. Mr. O'Donovan in his strategic remarks had talked about Bokhara. The people who were on the Caspian were also in Bokhara, so that he did not see why an advance should not come from Bokhara as well as from the Caspian, and in that case Merv would have very great importance. That Merv was now merely a howling wilderness was a political accident caused by the fall of the great empires of India and Persia. In the old days when Afghanistan was divided between India and Persia, there were no such things as inroads of Turkomans to carry off 40,000 people into captivity; and although he did not wish to make any political observation, the people who prevented the Persians from occupying Herat were not altogether guiltless as regards those 40,000 slaves.

Colonel Sir LEWIS PELLY said that twenty-two years ago he received from Sir Henry Rawlinson, who was then Minister at Teheran, instructions to proceed to Meshed, and so to Herat; then to cross Afghanistan and Beluchistan, and report to the Viceroy on the intermediate territories. He went by the ordinary route to Meshed, and there turned south along the Turkoman territory to Herat. At that time the Turkoman territory was in great commotion, owing to the attack of the Persian army, numbering 30,000 fighting men with the usual proportion of camp followers; but between Meshed and Khaf the country had been absolutely desolated by the Turkomans. He never ventured across any valley without first sending to the top of the watershed to ascertain whether there were any marauders in the neighbourhood. Nothing was more common than for him to come upon villages from which every soul had been carried off, leaving the pots and pans lying about just as they were when the raid took place. He understood that now that state of things had been altered by the proceedings of the Russians. Whilst he was at Herat, he was the guest of Sirdar Ahmed Khan, a relative of Dost Mohammed. His host one day told him that the Persian army had been defeated at Merv, and had divided into two columns, one retreating direct to the Persian frontier along the line of Sarakhs, and the remainder through the territory of the Seluk Turkomans up the line of the Murghab. He was asked to go out and see if he could be of any assistance. He therefore went and found the debris of the Persian army with their Prince Governor sitting like so many crows in the desert, most of them unarmed and many of them without uniforms. He went to the Prince Governor, in a small tent, who said they had trusted on their way down to the Seluk Turkomans, who received them with great kindness, but immediately on discovering the mess they were in, set upon them. The Persians had then fled, and were endeavouring to reach Herat or to cross the Persian frontier. The Prince Governor first of all asked him if he had come to laugh at them or to assist them. He (Sir Lewis Pelly) replied that he never laughed at men in distress, and that he would be glad to assist him in taking his footsore men to Herat. He then went to the second in command who was evidently preparing to depart. He said to him, "You are not going to leave?" The commander replied "Yes, I am going to mount and be off." Remonstrances were in vain, and he rode off, leaving the army in the desert. Sir Lewis said that if he

were a Russian officer he would undoubtedly press upon the Czar by all justifiable means to get hold of Herat. It was the natural capital of a Central Asian kingdom, and the very fact of a Russian pro-consul being there would cause every man who valued his property, his trade, and his life, to look toward that central government, and the whole country for a radius of 200 miles would naturally concentrate around him in the most peaceful manner.

A Journey in the Atlas and the Northern Part of the Algerian Sahara.

By VALENTIN DE GORLOFF.

(Read at the Evening Meeting, April 24th, 1882.)

My object in the present paper is to give the Society some account of a journey in which I have been engaged during the last six months in Algeria and the Algerian Sahara. I will first give a brief sketch of the region through which I travelled. It is divided into three parts: the first lies between the sea and the mountains, and is called the "Tell"; the second is formed by the Atlas range, and is called "the High Plateaux"; the third is the desert. I did not penetrate far south into the Sahara, but I think I may say, I am the first European traveller who attempted the journey without escort, except Arabs. The other travellers who have visited Wargla accompanied either military expeditions or caravans.

The regions south of Wargla, Ain el Taiba and El Golea, although they have sometimes recognised French authority and paid tribute, cannot be regarded as forming part of the French possessions. The country beyond Wargla is dangerous. Any one travelling without an escort would run great risks of being plundered or killed. The Chaambas inhabiting those regions are great friends of the marauding Tuaregs, and cannot be relied on.

I left Algiers the 14th of last December, and reached Laghouat by diligence, after five days' journey. With the kind help of some French officers I instantly began my preparations for my trip to Wargla. These, however, were soon stopped by the military commander of that district, who declared that he would not take the responsibility of my safety if I went alone. He then proposed my joining, at Metlili, a column of troops under the command of Colonel Belin, who were about to proceed with a convoy of provisions to Wargla. To join the troops was most irksome to me, on account of loss of time and liberty; but I was powerless to start alone, so I accepted the offer, resolved if possible to escape from my guard on the very first opportunity, and organised my caravan accordingly.

I engaged a guide who knew the desert well, but whose character did not bear investigation, having been formerly an insurgent. I then

hired two camels and a tent, taking with me, most necessary of all, a supply of water for five days. On the 23rd of December, amidst the snortings of 800 camels, I left Laghouat. Our first halting-place was Daia Abdi (the word *daia* meaning tomb). Here there was no water. As the evening came on the cloudless sky grew rosy, and bitter cold took the place of the pleasant warmth of the day. It froze, and the thermometer stood at 26° Fahrenheit. During the whole of my journey in the Sahara we had frost nearly every night. The following day (Christmas morning) the mountains faded in the distance behind us, and we began to feel the solitude of the desert oppressive. We encamped at Daia Legrat (no water), near a few dwarf turpentine trees.

Though the two officers of the convoy and I had contrived to have the best fare we could for our Christmas dinner, it was meagre enough, and made us envy our friends at home, who at the very moment when we were freezing in the desert were keeping the *fête* and amusing themselves. The same evening I ascertained that orders had been given respecting me which, in truth, would have made me a sort of prisoner in the convoy. On this discovery I at once decided to leave as soon as possible. That night I gave instructions to my Arabs, and next morning at dawn, taking advantage of a small ravine to our left, we escaped from the convoy and marched briskly the whole day along a valley. A few hours after a *spahi* of the convoy told the officer in command that I had taken the Guerrara track; but I had given a false direction, and the horsemen sent in search did not find us.

We encamped at Bou-Getfaia (no water). In the distance we were alarmed by seeing large fires, and fearing an attack from the nomads, passed the whole night without venturing to strike a light. Before daybreak we were up and resumed our march. It was necessary to reach Berrian that day, as our water supply was nearly exhausted.

After a long ride over a dismal plateau we reached a kind of gorge without any vegetation. After a little it turned sharp to the left, and suddenly there burst upon my view a most marvellous forest of palm trees; emerald green grass sprang up everywhere, while on each side of the way the crowns of the palms formed a complete canopy over our heads. Much refreshed at this sight, we pushed forward and entered the mud-built city of Berrian, where the Kaid Jahia-ben-Afari presently came up, and, politely saluting me, after the fashion of the country, by kissing my hand, asked me to his house.

Berrian is one of the six cities forming the semi-independent Mzab confederation, situated on the rocky plateau from 1000 to nearly 3000 feet high, called Chebka, on account of the number of ravines cut right and left into it. There are four principal valleys, viz. Ued Metlili, Ued Nsa, Ued Mzab, and Ued Zegrir. There is no water here but from wells, except when they have occasional rains, but this is very rare. Two towns, Berrian and Guerrara, guard the north-west and

north-east entrance of the country, then come the five cities of the Ued Mزاب Ghardaia, the capital, the wealthy Beni Isguen, the small cities of Mlika and Bou-Noura, and El Atef.

The Mزابites are a distinct people of Berber race. They formed the sect of the Kharedjites, soon after the death of the Prophet. After long wars they were nearly exterminated (350 Hegira, A.D. 1000); the remnant fled to the island of Djerba, to the Djebel Nfous near Tripoli, and to the Djebel Krime near Wargla, and there built Cedrata Mlika and other towns. There again they were attacked by the people of Wargla, and were obliged to seek another refuge. They then settled in their present domain, in the midst of a country so barren and desolate that probably no one cared to pursue them thither. They then took to agriculture, and forced the negro slaves to work at the wells; but finding that the culture of the soil was insufficient for their subsistence, they threw all their energies into commerce, trading with nearly all the cities of Algeria most successfully. I was very hospitably received in Berrian; perhaps part of the warmth of my welcome may be attributed to the rain which began falling just as I rode into the town. The people were all out of their houses, looking happy, inspecting their gardens and the sky. "You bring us the rain," said to me gravely the old white-bearded Kaid, "you are a man of good omen."

My camels were overtired, I gave them a feed of barley, and let them rest for the night, leaving next morning for Ghardaia.

We rode along a howling wilderness, not a bush, not a patch of green, not a pool of water, to be seen, only iron-coloured plateaux stretching as far as the eye could reach, with here and there a streak of red-coloured rock, here and there a sharp summit always conical, the evident result of primeval denudation, or some half-hidden ravine enclosed by abrupt crags. Late in the afternoon, after a long march, we came on the brink of a sharp declivity, where a valley suddenly opened full of palm trees growing in the golden sand. Surrounded by these trees is Ghardaia; it rises like a huge sugar-loaf surmounted by a clumsy tower, with a smaller tower leaning, much resembling the famous one at Pisa.

In the distance I could perceive the other cities. We entered Ghardaia at dusk, and I stayed some days visiting everything of interest. Some of the wells there are nearly 200 feet deep; but having no proper tools the Mزابites cannot prevent their rapidly filling, and then fresh ones have to be dug.

At the time of my visit to Ghardaia the inhabitants had ceased to quarrel with their neighbours as is their usual custom, and were busy discussing the intentions of the French to create an Arab bureau there. They are still independent, paying France a yearly tribute of 50,000 francs since the Treaty of 1853. However, they are soon to be annexed, as they are accused of having secretly sold powder to the insurgents.

The Treaty of 1853 gave great advantages to the French, assuring at the same time security to the Mزاب and their trade.

In 1857, the men of Ain Salah, fearing French annexation, at the same time envying the peace and security of the Mزاب, tried to negotiate with the French, and offered tribute; but somehow they could not agree, and later on, an expedition commanded by General Colonieu entered the Gourara, and frightened by this, Ain Salah gave itself up to the Sultan of Morocco. Since then no Frenchman is allowed to enter Ain Salah. Alarmed by this, and by the stagnation of commerce in the annexed Sahara, the French sent into the south a special mission headed by Soleillet, who, in his report to the Chambers of Commerce of Algiers, thus explains the object of the mission:—

“During Turkish rule on the north coast of Africa, numerous caravans imported into the Regency of Algiers the goods of Central Africa and the Soudan, and considerable exchanges were made in various goods at the Algerian ports. The day the French flag was hoisted on the ramparts of Algiers, these caravans abandoned Algeria, and took two directions, one to Morocco, the other to Tripoli.” He then goes on to accuse the English of having inspired in these people a defiance of the French rule, in order to be able to take in hand that commerce and export English goods. “And they have succeeded,” says he; “the commercial current of the south still comes to Ain Salah, the central point of the commerce in these countries. But all intercourse with the north has ceased, the caravans go from there to Ghadames and Tripoli or to Mogador in Morocco. Our French industry means to wrestle in the heart itself of Africa with English industry exclusively mistress of the commercial markets of this part of the globe.” Soleillet started from Laghouat and came before Ain Salah, but he was commanded to keep out of the city, the inhabitants pleading that they could receive no one without special orders from the Sultan of Morocco. Soleillet was threatened with the Tuaregs, and finally told that if he did not go back to the place whence he came they would kill him. He was thus compelled to return unsuccessful.

To the south of Ghardaia lies Metlili, the Chaamba city. The sitting-room of its *jemmaa* (town council) is peculiar; it is a subterranean gallery, ornamented by pillars, running round a deep well. By this ingenious contrivance the council is kept cool even in hot days, a desirable condition for a public assembly.

I finished the tour of the Mزاب cities by El Atef, and then left for Wargla on the 2nd of January. We generally followed the sandy bed of the Ued Mزاب, bordered by grey crags; the air now grew warmer, it hardly froze all night, and it was quite warm at noon. The first day we camped at Oglâ Lelfat (no water), the second at Haniet el Mrane (no water). Our preserve cans were exhausted, and I had to feed on the dates of my Arabs; true, my guide Ahmed once handed me over a

piece of meat cooked two days before in the Mزاب, but it had remained in his bag with his pipe, tobacco, and several other things, so I refused it.

The third day we began our march at three o'clock in the morning; at four in the afternoon, we left the tired camels and their conductor in camp, and Ahmed and I rode on to try to reach Ngussa that night. At dusk we came on the limits of the rock plateau we had been following ever since Laghouat. The scenery changed at once, queer sand-hills rose abruptly on all sides, the eye could not appreciate the distances or the declivities; sometimes the sand-hills formed in long ranges, like long Atlantic waves, sometimes they were chopped up like an angry Channel sea. The moon rose behind two hills, looking like a pair of horns, and illuminated the scenery with an unearthly livid red glare. Even the silence among those strange hills had something supernatural. At last the dark streak of the oasis came in sight, and as we pressed on the sand assumed a silvery hue, and puffs of soft perfumed air reached us. After crossing some high sand-hills we entered amidst beautiful palms, and having given water to our poor horses, who had carried us for eighteen hours, we stopped at the door of the Kaid.

The palm forest of Ngussa hides inexhaustible treasures for the artist. The town itself is curious with its mud arcades, its filthy and half negro population. Though small, Ngussa was ambitious, and in former days frequently gave trouble to Wargla. The constant feuds of the two cities gave the French a pretext to annex them both. The Agha (governor) at Wargla had been informed by a *mehari* (race camel) courier of my escape from the convoy and arrival. He had sent a horseman to Ngussa to inquire about me.

Next day, after two hours' ride among the sands, the long majestic line of the great oasis burst upon my view. There was Wargla at last. At the door of the city the Agha came to greet me, and informed me I was to stay at his *casbah* (government house).

I stayed a week in Wargla and regretted not having time to remain longer. I liked the town, with its tropical aspect and its negro population. It is all built of mud, so that when rain chances to come, it is always more or less in danger of melting. Indeed it had rained lately and the casbah was greatly damaged. The oasis with the surrounding villages contains a million of palm trees. The palm tree is the only resource of the inhabitants of Wargla. They depend entirely upon it. A palm tree gives generally a revenue of two francs a year. Now each of them is taxed 35 centimes. Considering how poor the people of these barren regions are the tax is a heavy one.

A few months before, the population, excited by the Chaambas, had been on the brink of insurrection, notwithstanding the severe lesson they had already received ten years ago. Near Wargla numerous Chaambas are encamped; this powerful tribe, the most southern of the

Arab nation, borders on the Tuaregs and is on good terms with those dreaded marauders. These last are a mixture of Berber and negro blood; they form four confederations.

1. The Aulimiden, near the Niger and Timbuctu.

2. The Tebus or Kilouis, to the east of the first and a little to the north.

3. The Hoggars, to the west.

4. The Azgars, to the east.

The Tuareg language is nearly the same as the Berber idiom spoken in the Gourara, the Tuat, in Ghadames, and at Rhat. But the manners and customs of the people differ greatly from those of their neighbours. They cannot have more than one wife and she possesses the greatest influence, not only in domestic but in political affairs. The Tuareg women are far more highly educated than the men, they can read and write well; their poems are celebrated in the desert and they have some musical talent. They walk about unveiled, while the men wear a black veil hiding the face up to the eyes. The people usually dress in rough striped cotton; their weapons consist firstly of an iron spear, rather light, and used occasionally as a javelin; a dagger fastened to the wrist, a sword much like those of the ancient Crusaders. They prefer hand to hand fighting, but seldom dismount from their small agile camels. It is believed that in the middle ages some persons of high birth emigrated to Africa and joined the Tuaregs. Several of them boast of their Montmorency descent.

The French wishing to extend their power in the Sahara, were brought into contact with the Tuaregs, and tried to establish friendly negotiations with them; but they met with little success, though M. H. Duveyrier penetrated into the heart of the Hoggar country. When the project of a railway from Algeria to the Senegal and Lake Chad began to occupy their minds, it was resolved to send a mission to ascertain the practicability of a railway. I obtained some details regarding the proceedings of this unfortunate expedition, the principal of which are as follows:—

The expedition consisted of Lieutenant-Colonel Flatters, Captain Masson, three engineers, Lieutenant Dianous, two subalterns, and others; in all ten Frenchmen, besides eighty Arabs for escort, and some Chaamba guides. They had 280 camels, four months' food, and a water supply for eight days. They left Wargla on the 4th December, 1880, following the Ued Mya. On the 18th they came to the well of Hassi-Inifel and found no water. The march was then resumed south-west, through a country destitute of water, and on the 28th they camped at Hassi-Insoki, 100 miles from Ain Salah.

From there the Colonel sent a message to Ahitagel, chief of the Hoggars, with whom Flatters had had some preliminary negotiations, and who was at Ain Salah, asking him to come to an interview at

Tiaokinine. The march from Hassi-Insoki to Hassi-el-Messaguem was accomplished without finding water on the way. After a stay they continued to Amguid through desolate country, arriving on the 18th of January. At last, when in the Ued Tejut, there came the answer of the Hoggar chief, borne by one of his relatives, a certain Cheikat. Though Ahitagel had not come himself, still the prospects were thought good, and Flatters pushed on.

Inzelman Txin (28° 30' lat.) was reached on the 23rd. The country continued deserted. The Tuaregs seemed to leave as the expedition approached. On the 10th of February, near Titen Afera, a Hoggar deputation, headed by a certain Tiasi, visited the camp in detail and appeared to covet greatly its contents. After the visit they departed abruptly. From this day the Colonel seemed nervous and thoughtful. Still he tried to keep calm before the men, and never failed to cheer them up. From this day too, numerous camel footprints were observed in the rear, though the camels themselves were not to be seen.

Two Tuaregs came on the 15th February, passed the night with the Chaamba guides, and departed in the morning. No doubt they had come to give to the latter their final instructions. Next day near the evening, the guides declared they had missed the well which stood at some distance to the right. They proposed to encamp where they were, and that while the men would stay to guard the camp, the mission and the unloaded camels would go to the well. The Colonel agreed reluctantly, and marched to the well with his companions; the camels followed a certain distance behind. The only guide who appears to have remained faithful warned him he was being betrayed, but the Colonel heeded him not. They came at last to the well. A few minutes later a large party of Tuaregs, mounted on their camels, appeared suddenly at the entrance of the gorge, and charged on the mission with loud yells. At this moment the Chaamba guides sprang on M. Roche and Guiard (two of the engineers) and massacred them. The Colonel and Captain Masson walked up to the Tuaregs and despatched several with their revolvers, but fell at last overpowered; the camels were then captured. The fatal news soon reached the camp. M. Dianous and his men, destitute of their camels and of food, were at seventy-two days' march from Wargla. Still on the following day they began the retreat. Soon famine and fatigue began to tell amongst them.

At Amguid Tuaregs appeared, and showed a friendly disposition, offering dates to the survivors. With the fruit had been mixed *jusquianas* leaves, and the unfortunate men, labouring under the fatal poison, tottered and fell as if intoxicated.

They did now what they ought to have done at the beginning. They marched on the Tuaregs, attacked them, and routed them, killing over forty, but losing Lieutenant Dianous and M. Dennery. The Tuaregs fled, and no more of them was seen; but famine and thirst

ended the work of destruction, and the survivors were reduced to the dire extremity of cannibalism through hunger and despair. A few days after, help sent from Wargla at last reached them. Eighteen were still living. Afterwards some more came, prisoners that had been made by the Tuaregs and who had escaped. One of them I saw at Wargla brought by two friendly Azgar Tuaregs.

Ahitagel, the Hoggar chief, was very proud of the deed. He wrote to the Emir of Ghadames:—"You warned us," said he, "to protect our land against the foreigner, and we have done so. Our people have waged a holy war, and with success." Ahitagel ended his letter by asking the emir to inform the sultan of his high deeds. This conduct is a curious proof of the great moral prestige Turkey has throughout North Africa; even in Algeria that prestige reigns throughout, much to the annoyance of the French.

Before leaving Wargla I went to the Djebel Krime, a round hill, very abrupt, and accessible from one side only. On its top is a well of great depth, reaching a good deal lower than the foot of the hill. It seems that once there was a village on the summit. Its old sheikh had two sons; one of them, of social disposition, did not think a hill-top was the right sort of place to live on, so he went to Wargla, and secretly fetched a bag of salt, which he threw down the well. Next morning the old sheikh found a strong salt taste in the water, and his son persuaded him easily that the well was filling up, and that they had better go down in the plain below, and live amongst the other men.

The fine ruins of the antique Mزابite town of Cedrata lie buried in the sand at the foot of the Djebel Krime. I found there some beautiful ornamented walls. Mr. Tarry has lately occupied himself with those interesting fragments of a decayed art.

I dismissed my Arab guide, and on the 12th January left Wargla with one of the Agha Abd-el-Kader's horsemen, taking with me hardly any baggage. We slept at Ngussa. Next morning, through a comparatively smiling landscape, we rode about 50 miles to the village of Hadjira, where we slept that night. Following the sandy bed of the Ued Mya, ornamented by grey and white vegetation, we reached on the following day Blettamar; but the sheikh could not receive us, owing to his roof having fallen, melted by the rain, so we rode further. From this place to Biskra extends a sort of subterranean sheet of water, so that wells abound, and with them life.

It is this depression of the Algerian Sahara, called the Ued Rir, which has misled some persons into believing that the whole desert is like it, and that it is a country with a great future. I regret not to be of their opinion. Sidi Mahamar, the marabout (priest) of Temmacine, received us well, and next morning early we entered Touggourt. Here ends the true desert. Touggourt itself is already half civilised, a few Frenchmen and Jews having opened some shops. For the first time

for a month I had the pleasure of sleeping in a bed at the Agha's casbah.

Touggourt is not a very interesting place after Wargla, but the oasis of the Souf, situated near at hand, is a most curious region, and gives a true impression of the stern beauties of the desert. The *aregs* there are no longer sandhills, but mountains, whose forms change with the wind. They range from 140 to 200 feet high. From Touggourt to Biskra the way is a military road. Cavalry do it in four days, and a good *bordj* (caravanserai) marks each halt.

On the way I met M. Fourreau, an intelligent colonist, founder of the Ued Rir Company; which has bought large tracts of these barren sands, and by means of artesian wells converted them into sources of wealth. They possess now at Ourlana, Tamerna, Zaoucina, and Foughalla, more than 25,000 palm trees. This is the real serious beginning of French colonisation in the Sahara. Unfortunately the military authorities, who dislike innovations, are hostile to the company.

Before reaching Biskra I passed along the immense salt-water bog—the Chott Melrir. This chott and two others form a line of water extending from Biskra to Gabès. M. Roudaire is sanguine that, by cutting through the belt of land between the chotts and the Mediterranean, an inland sea may be created which will be beneficial to the climate, to commerce, and so forth. A closer inspection seems, however, to have been unfavourable to M. Roudaire's conclusions. It was reported that the chotts were separated from the sea by a rocky plateau about 150 feet high and 14 miles wide, that the chotts were separated from one another by high belts of land, and lastly, that the bottom of the Djerid was about at the level of the sea. The region seems not to have been satisfactorily surveyed. However, if even the inland sea be created, I doubt if it can have any great influence on the general climate of Algeria and Tunis.

I left Biskra, and after a few days' ride reached Bou-Saada. The first day I slept at Mdoukal, a most picturesque village. The following day an Arab chief of the Uled Nails most hospitably entertained us. On the thirteenth day we reached Bou-Saada, through a stern and imposing mountain pass devoid of all vegetation. From that fine basis I rode in two days to Djelfa, and thence again to Laghouat, along the bitterly cold plateaux.

After a stay there I reached Ain Madi. I now entered the Djebel Amour mountains, and the cold commenced to be felt. At El Reicha we found snow, and at Aflou the thermometer stood at 20° Fahrenheit. At Taouiala we were overtaken by a severe snowstorm; my guides lost their way, we were nearly benighted on the dreary plateau, and in much danger of being frozen to death. It was therefore with some satisfaction that I found myself two days later at Geryville. Along our route the ground was strewn with dead camels, marking the passage

of the troops. Geryville itself is not remarkable, lying on a wild and dreary plateau; but Brezina, to the south, and situated at the entrance to beautiful rocky defiles, is a charming little place. It belonged to the famous Uled Sidi Sheikh tribes so much dreaded in the south, and now in hostility with the French.

From Geryville I reached in two days' ride the Kreider; I cannot describe the pleasure that I felt in seeing the railway again. This railway was constructed for military purposes in a remarkably quick time, and reaches Mecheria, a most important strategical point.

From the top of the Djebel Antar, the mountains next to it, I could discern the far-off peaks above Figuig, the Moroccan oasis, coveted by the French, which I had not time to visit. The country is said to be most beautiful. Figuig is a most important station. The railway now at Mecheria could easily be continued up to it. It would form the true starting-point for a railway to Timbuctu, south of Figuig; the Tafilalet and the oasis of the Gourara form a fertile tract of land watered by important rivers along which one could reach with little difficulty Ain Salah, which is about half-way. But would that railway be useful? Would it pay? I leave it to others to decide. There are many in France who proclaim the Sahara a rich country where fortune is to be made. But if such persons would travel for a time in it, I think they would change their opinion.

In introducing the author of the paper, the PRESIDENT said that M. de Gorloff was a young traveller, appearing for the first time before a public audience. When he had barely attained his majority, and just left a sick-bed, he started for the Algerian Sahara; and he had examined a considerable part of it which was hardly known at all to Englishmen, few of whom had visited it, and very little had been written about it. He had no doubt that the French, who were extending their occupation of that country, had accumulated much information about the region; but their reports had not yet been published, so that much of it was in fact a new country. Of late years projects had been brought forward for letting in the sea upon the Sahara; and to some small extent those projects might be realised; but as it was now discovered that the Sahara, instead of being below the level of the sea, was in the greater part of it considerably above it, either in the form of hills or high plateaus, the original scheme had been dwarfed into one of very small dimensions, and was hardly likely to fulfil the expectations of those by whom it was devised. With regard to another scheme which had been discussed by some very able men, namely the driving a railway across the immense desert, in order to connect the Algerian provinces with Senegal, some observations would be made by M. de Gorloff, who had been in the country from which it was suggested that the railway should start, and who had been in communication with many of those persons who were interested in the question. Like most of his countrymen, M. de Gorloff was a polyglot, and in addition to several other European languages, could express himself very fluently in English.

After the paper the PRESIDENT said he regretted extremely the absence of Mr. John Ball, one of the few Fellows who had, in company with Sir Joseph Hooker, travelled through the adjoining regions of Morocco, and who had given a most interesting

account of that country and its botany. Had he been present on this occasion, no doubt he would have been able to throw some interesting light upon some of the subjects mentioned by M. de Gorloff; but he was an enterprising man, and was now on his way to Chill, bent on scientific research.

*Rev. Thomas Wakefield's Fourth Journey to the Southern Galla
Country in 1877.*

AMONG the many missionaries who lose no opportunity of adding to our stock of geographical knowledge, Mr. Wakefield is one of the most prominent. To him our Journal is indebted for a paper on the caravan routes leading from the coast to the Victoria Nyanza, and a vast body of similar information, dealing with the least known parts of the Galla and Somali countries was deposited with us before his recent return to the scene of his former labours in Eastern Africa. Amongst his papers was found an account of a journey to the neighbourhood of Malindi, and although we have already referred to this expedition,* we deem the subject of sufficient interest to furnish our readers with a more ample account, accompanied by a map, which gives an insight into some features of African topography not to be obtained from our ordinary small-scale maps.

Mr. Wakefield, for years past, has been most anxious to establish a mission among the Gallas, whom he looks upon as a manly and intelligent people, very different from the weak-kneed and unreliable negroes who live around his usual home at Ribe. After twelve years' negotiations with the Bararetta Galla (who are known to the Somali as Wardai, and live in the district extending from the river Dana to within a short distance of Malindi) he obtained the consent of the chiefs to his undertaking, and performed the journey in question for the purpose of knitting closer the ties of friendship, and selecting a site for the proposed mission.

On August 23rd, 1877, he started from Cheetham Hill, near Ribe, accompanied by his fellow-workers Seden and Randall. He crossed Kambe, and forded the Kátama river after a march of close upon two hours. This is a perennial stream of a greyish-blue colour, which takes its course through a sandstone region, and bounds Giriya on the south. The road beyond led through an undulating country with good pasture grounds and occasional fields, as at Tsakára Lóvu. After a total march of two and three-quarter hours Cha Nagánde was reached. This is a group of villages surrounded by a belt of forest, the passages through which are arranged in such a way that they can be easily blocked up on the approach of the Masai, who only the year before had attacked the settlement, but were driven off with a loss of eleven dead. The people here are described as being "void of all generosity and importunate beggars."

* See 'Proceedings,' 1879, p. 684.

The second day's march brought the travellers to Kazi ya Moyo. The soil was sandy, of a reddish-brown colour during the earlier part of the journey, and of a lighter kind later in the day. The vegetation in the depressions was luxuriant, and at Livóli, the midday halting-place. Mr. Wakefield was struck by the large number of butterflies. Before reaching the village a sandstone ravine, Ndzovúni, had to be crossed, beyond which extended a belt of dense forest. Kazi ya Moyo is of considerable extent; Mr. Wakefield had staid there some time in 1865, and the natives hailed his return with shouts of delight, and sought to honour him by performing the *ndáro* or processional dance around his hut. Yet, in the morning, the old chief very impudently asked for hongo, and disdainfully rejected the four yards of calico which were offered him.

Messrs. Seden and Randall here parted from Mr. Wakefield and took back with them to Ribe the donkey named "Bismarck," which had broken down; Mr. Wakefield waited until he had been joined by a more powerful beast, "King William." This delayed him until September 5th.

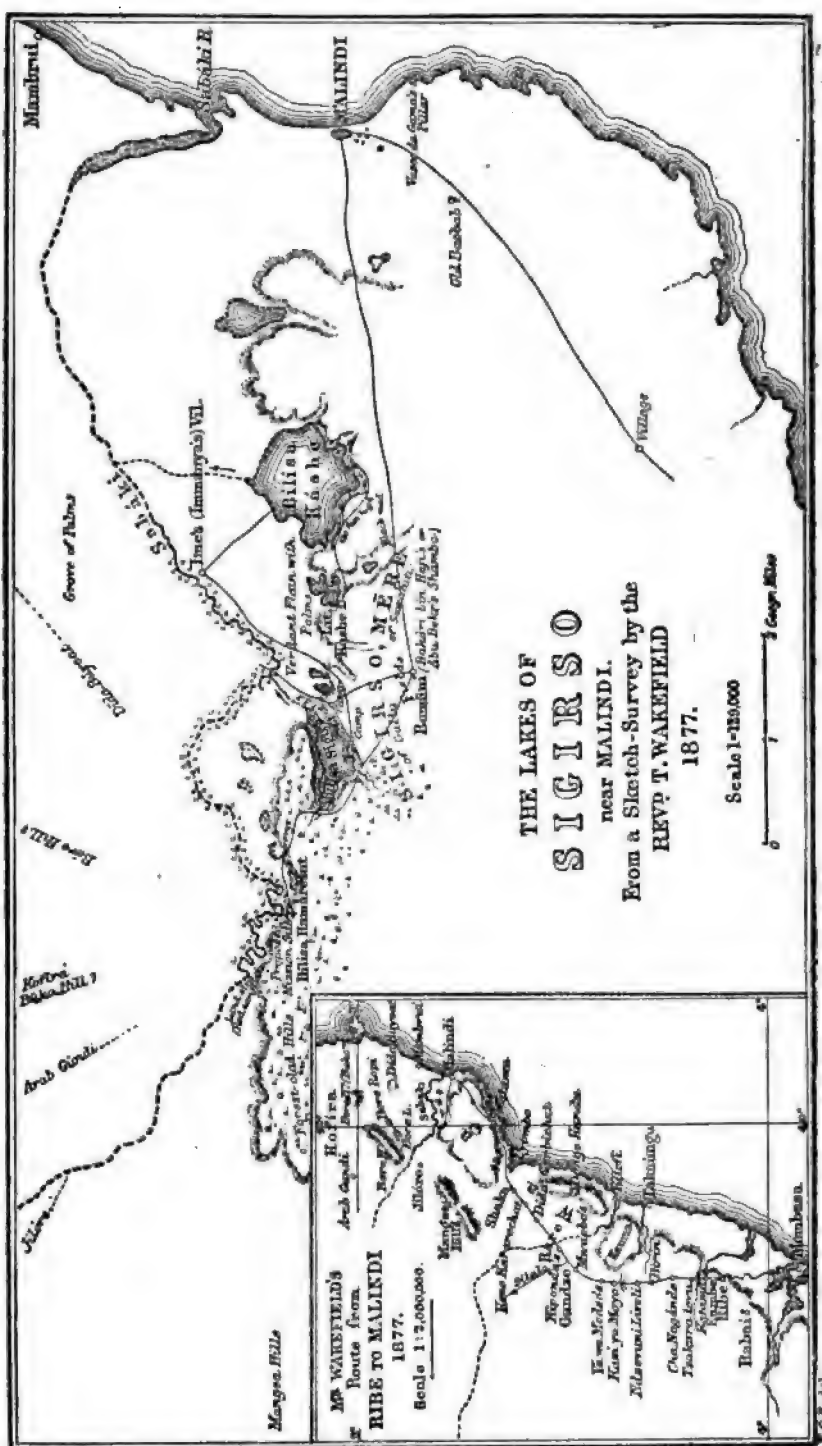
His early departure on that day was hindered by heavy showers of rain, which fell at intervals until half-past nine. A short distance beyond Kazi ya Moyo he passed through Ya wa Medza's village, and then pursued a winding path through a dense forest, until he emerged upon a level tract of white sandstone, overlooked by the heights of Káuma. Here men, women, and children were working in the fields; they stared at the donkey, but marvelled more at the length of Mr. Wakefield's nose, the children running after him and crying "Look at his nose!" The night's camp was pitched in Gandze, close to the village of Mwaéba, who claims to be a Christian.

On August 28th a march of two hours forty minutes through a region of reddish sand, partially wooded, brought the traveller to Kiponda's village in Räre, whence could be seen a lofty mountain-range towards the coast, one of its peaks, Dóngo Kúnda, being conspicuous on account of a patch of red clay which, seen from afar, resembled a pit of reddle. These mountains are covered with forest, and are inhabited by nomad hunters, known to the Galla as Wata, whilst the Swahili call them Walangulo and the tribes further north Wasánya.

Kiponda's village occupies a clearing in a forest abounding in mahogany, and is defended by a stockade. Its fifty huts are occupied by Wagiriyama, who keep goats and poultry, and grow corn. The chief is a feeble old man of eighty, who wears a jacket and a fez to show that he is a Mahomedan.

Continuing the journey on the 29th, Mr. Wakefield traversed fields of millet and Indian corn, and then crossed a brackish stream,* beyond which there extended a level and fruitful tract of reddish loam. The

* This must be the Múho wa Mangulo, which rises in Teita and enters the sea at Kileli.—Ed.



midday halt was made in a district known as Dida Gerbichât, that is, "country of slaves." Beyond this park-like region a dense forest was entered, and the night's camp was pitched in an open glade known as Kóno Kárárchât, where there was a pool of water, with purple lilies growing around it. The Wata eat the bulbs of these lilies, and the Galla, since they have been reduced to poverty by the Somali and Masai, do so likewise. Mr. Wakefield found these bulbs rather pleasant eating, though they lacked flavour.

An hour's march through the forest brought the traveller, early on the 30th, to the cultivated district of Shaka, which belongs to the Wali of Takáungu. Three-quarters of an hour beyond he passed some huts where slaves and Wata labourers were storing millet. The Wata engage themselves for this work merely on condition of being fed. The residence of the governor of Takáungu, at Uyombo, was reached after another three-quarters of an hour. There Mr. Wakefield encountered the German traveller Dr. Fischer, who was travelling along the coast to Malindi.

Leaving Uyombo Mr. Wakefield travelled for some distance near the beach, where rough blocks of coral much impeded his progress, then crossed a tract of black soil, and finally emerged upon a grass-clad sandy plain. He passed the night near a group of huts belonging to the people of Watámu, and at a distance of two hours thirty-five minutes from Uyombo.

The last day's march before reaching Malindi at first led through forest, then through jungle, and finally through fields of millet and sesame.

Malindi is now at peace with the Galla, and is spreading to the northward. Its prosperity would, perhaps, be greater if it were not for the heavy market tolls which are levied. As an instance, Mr. Wakefield mentions that a dollar has to be paid for each bullock brought into the town from the neighbouring pasture-grounds. He found no slaves exposed for sale, and he states that the man whom Mr. New states to have been flogged to death was not a slave, but a burglar, who had been caught for the third time.

From Malindi Mr. Wakefield turned his face westward towards Galla Land. A march of 2½ hours through a fertile region brought him on September 2nd to the district of Sigírso, called Mère by the Swahili. Here Bakári ibn Haji, locally known as Abu Bekr, and a native of Lamu, owns a prosperous shamba, consisting of some fifty huts built within a stockade of fan-palm stems, and surrounded with fields of millet and rice and sesame. This man made friendly overtures, but Mr. Wakefield had been warned against his wiles, and bearing in mind that some years before he had nearly succeeded in poisoning Mr. B. Binns, he wisely abstained from eating a rice cake which had been presented to him as a token of friendship.

The "palavers" with the Galla proved rather tedious. Ime or

Immanya, the Galla guardian of the road, forbade Mr. Wakefield to go into the interior, but allowed him to explore the neighbourhood. At length, on September 18th, an embassy from the Galla chief Aba Laga Jara brought the sought-for consent to the establishment of a mission, on condition that the missionaries would abstain from interfering with the settlements of runaway slaves. The site selected occupies the top of a cliff of loam, about four or five hundred yards from the Sabáki. Mr. Wakefield's religious intercourse with the Galla was of a satisfactory nature, and they readily joined him in prayer. They told him that they called themselves Oroma and the Europeans Dunga. They believe in Wake, the creator of all things, who is good, wise, and righteous, and in a future state. When the spirit leaves the body it becomes an *ékera*, or "demon," and goes to Bála Bagadā, that is, the "deep chasm" or "bottomless pit." This they describe as an uncomfortable place, and good and bad go there indifferently. Kurtumo Muro is the prince of the *ékera*.

Sigírso is a slightly elevated plain, the depressions upon which are occupied by lakes. A fresh breeze blows across it, and the climate is healthy during the rainy season. The water supply is good. At Bakári's village mosquitos, *gandi* and *worana* flies abound, but they are not found near Ime's village on the Sabáki. That river varies in width between 12 and 16 yards. Its water is drab-coloured. A fringe of forest extends along it. A verdant plain, dotted with palm trees, stretches beyond this forest belt to the foot of the banks or cliffs of clay and loam rising above the lakes. Of these lakes, that known as Bilisa Káshe is the largest. It is named after a bivalve shell abounding on its margins. Bilisa Sigírso is next to it in extent. Its water is pure, although Mr. Wakefield fancies he discovered an astringent taste. It never dries up, and after heavy rains drains into the Sabáki. Its slopes are wooded in the west, grass-clad in the east, and immense fields of rice, millet, and sesame occupy its lower end. Crocodiles and hippopotami abound in it, and spiral shells in large numbers are found on its muddy beach. The ridges almost encircling it are composed of light-coloured clay.*

Captain Paiva de Andrada's Zambesi Expedition, 1881.

THE mineral riches of the Zambesi country in gold and coal have recently attracted the special attention of the Portuguese authorities, and when Captain Paiva de Andrada, after inquiry into the subject on the spot, applied for a charter authorising him to utilise these resources of the East African colony, his prayer was readily granted. An enterprise of this kind,

* We have inserted upon the accompanying map the localities of which Mr. Wakefield gives the bearings. The Bore lake is probably identical with the Asháka Mále Masáme, near which Mr. Wakefield passed in 1865.

practically acquainted with coal-mining; a chemist, M. Guyot; a surgeon, M. Goffant; a secretary, M. Courret; and a wealthy private gentleman, M. Rigail de Lastours, who undertook to act as photographer. There were, in addition, three French and three Spanish miners.

This formidable body of experts reached Quillimane (Killimani) on April 13th, 1881, and left for the Upper Zambesi between the 18th and 20th of that month.

We are indebted to the kindness of Captain Paiva de Andrada for a first instalment of the geographical results of their exploration, consisting of a carefully drawn map of the route leading from Senna to the famous old gold-mines of Manica. The exploring party left Chemba* on the Zambesi, on September 2nd, and reached Mulassa, the present capital of Manica, on September 22nd. It took nineteen days' marching to perform this journey of about 200 geographical miles. Mulassa stands on the river Odzi, which flows west towards the Sabia; but all the other rivers of Manica take their course towards the south-east. A fortnight was spent in examining the placers on the Revue, where may still be traced the ruins of Massi Kesse, the old Portuguese feria, and then the explorers turned homeward, reaching Senna on October 22nd. We had been led to believe, from the information obtained by St. Vincent Erskine whilst at Umzila's, that the whole of Manica had been turned by marauding Zulus into a howling wilderness. These accounts, however, were evidently exaggerated; for the explorers found the "kingdom" in a state of peace, and its ruler desirous of placing himself under Portuguese protection.

Whilst one detachment was thus absent in Manica, M. Guyot headed another party for the exploration of the Muareze, which enters the Zambesi below Tette.† He ascended that river for a distance of 15 miles to the north-east, finding coal and curiously shaped masses of diorite, but was compelled to retire in consequence of the hostile attitude of Bonga's band of robbers. It was only the presence of his fifty armed natives which saved him from being plundered.

Captain Paiva de Andrada, in an attempt to penetrate northward from Tette, fared even worse, for not only his porters, but also his soldiers deserted him; and in face of the unfriendly spirit of the natives, he was compelled to turn back from Mashinga, 50 miles to the north of his starting point.

We look forward with interest to the publication of the full results of this important expedition.

* This is identical with Shimbwa on the Royal Geographical Society's large map of Eastern Equatorial Africa. We have given an exact copy of the Portuguese map, and have also retained the Portuguese orthography. Herr Mauch's route is indicated in hair-line. The position of Senna is that adopted by Mr. Arrowsmith for Livingstone's map. Livingstone's astronomical observations (the mean of eight lunars) place Senna in long. $34^{\circ} 57' E.$, and this result has been accepted in the Society's map.

† This is probably the Mimrazi (mis-spelt for Muarczo?) of the Society's map.

GEOGRAPHICAL NOTES.

The Leigh Smith Search and Relief Expedition.—Arrangements have now been matured for the relief of Mr. Leigh Smith's expedition. Sir Allen Young, C.B., will command the vessel employed for the search and succour of the crew of the *Eira*; and a steam whaler, the *Hope*, of Peterhead, has been hired for the service. Instructions have been prepared by a committee consisting of Mr. T. V. Smith, Sir George Nares, Sir Allen Young, Sir Henry Gore Booth, Mr. Clements Markham, and Mr. Grant; with Admiral Sir George Richards and Commander Beaumont nominated by the Admiralty. The main objects of the *Hope* will be to establish cairns and depôts on the west coast of Novaya Zemlya, and to search the Barents Sea, in such directions as the condition of the ice may admit of. Baron Nordenskiöld, Lieutenant Payer, Commodore Jansen, and Mr. Oscar Dickson have been consulted, and the letters containing their views were carefully considered by the committee.—The *Hope* will sail in the course of this month. Meanwhile Sir Henry Gore Booth, accompanied by Mr. Grant, has sailed in the Arctic yacht *Kara*, of 85 tons (yacht measurement). The original object of this cruise was of a sporting and partly a scientific and artistic character; but Sir Henry now intends to endeavour, so far as his means will allow, to co-operate in measures for the relief of the *Eira*.—In these arrangements, limited as they are owing to the private nature of the efforts that are to be made, the great importance of searching on the north and east coasts of Spitzbergen has not been lost sight of. Fortunately the Swedish expedition, under Captain Palander, will be at Mossel Bay in July; and that distinguished officer, as well as the walrus hunters, will be requested to look out for and assist any retreating parties.

The 'Jeannette' Expedition.—The fate of the gallant commander of the expedition and his companions of the first boat is no longer uncertain. Melville despatched from the Lena Delta on the 24th March the following message (telegraphed from Irkutsk on the 5th of May):—"I have found Lieutenant De Long and his party; all dead. All the books and papers have also been found. I remain to continue the search for the party under Lieutenant Chipp."—Four of the survivors, including Lieutenant Danenhauer and Professor Newcombe, the naturalist of the expedition, arrived at Hull from Cronstadt on the 17th of May, and proceeding straight to Liverpool, embarked there on the 19th for New York. Lieutenant Danenhauer takes with him the log of the *Jeannette*, extracts from which, together with details of great interest communicated by Danenhauer to the special correspondent of the *New York Herald* at Irkutsk, were published in the European editions of that paper of dates April 26th, May 3rd, and May 10th. Two

islands in the Arctic Sea were discovered by the *Jeannette* before she was lost, one "Jeannette Island," in N. lat. $76^{\circ} 47'$ and E. long. $158^{\circ} 56'$; the other "Henrietta Island," in N. lat. $77^{\circ} 8'$ and E. long. $157^{\circ} 43'$. A third, "Bennett Island," was discovered during the passage in boats from the wreck to the Lena Delta; the south cape of this island was in N. lat. $70^{\circ} 38'$ and E. long. $148^{\circ} 20'$.

Loss of the 'Rodgers.'—The *Rodgers*, which was sent out in search of the *Jeannette* last summer and was wintering at St. Lawrence Bay, was destroyed by fire on the 1st of January. According to recent accounts from New York, Colonel Gilder, correspondent of the *New York Herald* on board, who was despatched by Lieutenant Berry to report the loss of the ship and try to obtain immediate assistance, had marched alone through the Chukche country in North-East Siberia to Sredni, or Middle, Kolymask, where he arrived about the end of February. He then proceeded, in company with the governor of this district, Feodor de Barawa, to Verkhoschansk, where he intended to wait the arrival of the correspondents who were going to the mouth of the Lena to look for De Long. Colonel Gilder states that the crew are now in Tupkan, where they obtain sufficient food from the Chukches. The governor of Kolymask had also sent them tea and tobacco to barter with the natives. They were fortunate enough to save three months' provisions from the burning ship, but all attempts to save the ship itself were in vain. She lay quite a short distance from the coast, but the young ice would not bear the weight of the men, and it was with great difficulty that communication was established between the ship and the shore. The whole of the crew landed safely, partly by means of the boats, and were in good health and spirits, without any danger of running short of provisions. The Governor of East Siberia, Tcherniaieff, had also sent injunctions to the Chukche chiefs to help the shipwrecked men by every means in their power. It is now proposed in Washington to send the revenue cutter *Corwin* for the crew of the *Rodgers*, instead of fitting out a man-of-war, the *Iroquois*, at San Francisco, as at first suggested. They are expected to return by way of Alaska, and to reach California in August. During the last few years the *Corwin* has several times been to Cape Serdze, in Behring Strait. She is a strong vessel of 227 tons.

Lieutenant Hovgaard's Expedition to the Arctic Regions.—Lieutenant Hovgaard, whose projected expedition in search of the *Jeannette* fell through in consequence of the arrival of news of that ill-fated vessel, is still determined to undertake an expedition this summer to the Arctic shores of Asia, and further north if possible. For this purpose he has purchased the Swedish steamer *Linköping* at the price of kr. 25,000, or about 1400*l.*, which amount has been contributed by a Copenhagen merchant, Herr Aug. Gamel. The steamer is of 150 tons register, 107 feet long, and $22\frac{1}{4}$ feet beam. It is a wooden ship and

has hitherto traded between Linköping and Gothenburg. She will be strengthened and fitted for the expedition at Copenhagen, and will, instead of her present coating of iron, receive a three-inch casing of oak. Lieutenant Hovgaard has expressed himself entirely satisfied with this vessel for his expedition. He intends to make a start early in July, directing his course for Cape Chelyuskin, afterwards endeavouring to reach Franz-Josef Land. He has re-named the vessel the *Dympna*.

The Elephant Experiment in Africa.—We are requested to correct a misstatement which appears in Mr. Rankin's paper on this subject in the May number of the 'Proceedings,' made doubtlessly through inadvertence. The four elephants are there said to have been *presented* by the Bombay Government to the King of the Belgians; this was not so; the elephants were purchased of the Bombay authorities.

M. Roudaire's Projected Inland Sea in the Algerian Sahara.—The scheme of the creation of an inland sea to the south of the fertile portions of Tunis and Algeria, proposed by Commander Roudaire, has at length been taken up by the French Government, in so far as a joint committee of members of both chambers and representatives of the various departments of the government and of public institutions has been appointed to consider the question. The sea is to be created by letting in the waters of the Mediterranean from the Gulf of Gabes by means of a canal to be excavated across a bar of land from the shore to a chain of interior basins or desiccated salt-lakes, called the Chotts of Rharsa and Melrir, which extend through Tunisian and far into Algerian territory. The area of inland waters thus produced, it is stated, would be seventeen times that of the Lake of Geneva. As the bed of the Chotts is to a great extent below the level of the Mediterranean, all the engineering labour believed to be necessary is the excavation of the canal, which is to be 150 miles long, with a minimum depth of 33 feet below the water-level, and a width at the surface of 110 yards; the scouring effects of the current when the water is introduced are relied upon for economising hand-labour in deepening the basins, but how far this is to be depended upon is one of the doubtful features of the scheme, the opinions of engineers with regard to the effect to be produced varying in the proportion of 1 to 10. Results of great value and importance are expected if the project should be realised; a barrier would be created against the incursions of marauding tribes from the Sahara, and an opening created for French commerce into the heart of the country. In some quarters hopes are excited of a complete revolution in the climate of the Sahara by the introduction of so large a tract of water into what is now a scorched and sterile desert. To this view it is objected that the new inland sea could not have a permanent effect on the climate, as it would be likely gradually to silt up with the accumulation of saline deposits in its bed, the natural result

of the great evaporation in so dry a climate, a process the more rapid inasmuch as the supply of water would be derived exclusively from the very saline Mediterranean and not from rains or rivers. At any rate it appears that the best authorities are convinced that a wide belt of country around the sea will be rendered humid and fertile, and the concession of this bordering tract is all that is asked for by the promoters to repay them for the cost of the undertaking.

Mr. A. R. Colquhoun's Journey through South China, &c.*—During April further letters were received from Mr. A. R. Colquhoun, one of which is dated from Wu-chow, on the Si-kiang or West River, on February 11th. Mr. Colquhoun reports that he and his party had had a most interesting and pleasant journey up from Canton. The scenery on the river they had found most beautiful, and it had fairly astonished them. Mr. Colquhoun says that so far as he has been able to find, none but the most meagre accounts have been made public respecting the Si-kiang between Canton and Wu-chow, while above that place nothing has been written about it, and, indeed, except that Mr. Cameron, of the China Inland Mission, crossed it in his westward journey from Pakhoi on the coast, of which he has never furnished any record, it is absolutely untravelled by Europeans.—A letter of a few days' later date announces that the expedition were working their way up the river beyond Wu-chow, but that news had reached them of placards having been posted a little higher up offering a reward of 200 taels (say 60*l.*) for each of their heads. They were consequently confined to their boats, and fully disguised in Chinese dress.—During the past month a letter has been received giving accounts of substantial progress along the Yü tributary of the Si-kiang, which, after visiting Nan-ning, they will ascend in a north-westerly direction to its source in a mountain pass on the frontier between the Kwangsi and Yünnan provinces in about N. lat. 24°, E. long. 105°. At this place the first stage—and very probably the most troublesome one—in their important journey will be brought to a conclusion. The letter in question is dated Nan-ning, February 27th, and sketches very briefly their journey to that important commercial emporium, of which, however, they were unable from want of time to give any information, as they had suddenly received a pressing intimation from the authorities that they had better continue their journey at once on account of the hostility of the people, which appears to be due to a variety of accidental causes.—Mr. Colquhoun and his companion, Mr. C. Wahab, have been continuing the survey of the Si-kiang made by Lieutenant Bullock as far as Wu-chow, but their labours in this direction will necessarily be of a somewhat rough and preliminary nature. As far as they have gone, they have found the river, or rather, perhaps, the Yü affluent, to be exceedingly tortuous, but with few and comparatively unimportant obstacles in the shape of

* See *ante*, p. 234.

rapids and rocks, which present difficulties of a trifling nature to the European engineer. There is no doubt, indeed, that the Si-kiang and its larger tributaries form a splendid water-way into the interior, and that not many years ago a very extensive trade was carried on along them with South-Western China.—As far as they have gone, thanks to letters furnished them by Her Majesty's Consul at Canton, the party have met with no interference on the part of the Chinese authorities, who have occasionally shown a somewhat embarrassing care for their safety, by sending gunboats to convey them from place to place.

New Expeditions to Sumatra and Upper Burma.—The Société Académique Indo-Chinoise of Paris has decided to send out two of its members, MM. Henri de Vésine Larue and Maurice Geny, to continue the scientific work begun, in 1879, by MM. Wallon, Guillaume, and Courret, which was so tragically interrupted by the murder of the two first in Sumatra. The new expedition will land on the western side of Sumatra, and after exploring the lake Putschut-Laut, cross to the eastern side of the island, there embark for Penang, and continue *viâ* Quedah and the Siamese provinces of the Malayan Peninsula to Bangkok.—Another expedition, of which M. G. Garanger has charge, having for its object scientific researches in Upper Burma, left Marseilles a few days ago for its destination. Besides geography and ethnology, M. Garanger will pay attention to commercial and industrial subjects, with a view to obtaining information for the benefit of French traders to the Irawadi valley. Both expeditions will make collections, which will be presented by the Society to the French Government.

Ascent of Mount Cook.—The Rev. W. S. Green, a member of the Alpine Club, who started last November for New Zealand, accompanied by the Bernese Oberland guides, Ulrich Kaufmann and Emil Boss, succeeded on the 2nd of March last in ascending Mount Cook, the highest known Australasian peak. His first camp was at the foot of the Tasman glacier (of which an account is given by Von Haast in his 'Geology of the Provinces of Canterbury and Westland,' published at Christchurch, N.Z., in 1879), but it had to be moved higher up the mountain, an operation requiring a week's work, owing to the rough road and dense scrub. On 25th February an unsuccessful attempt was made to ascend by the southern ridge, which faces the traveller approaching the mountain by the Tasman valley, and insurmountable obstacles were also met with on the eastern spur, which was attacked on the 27th, the party making their way to a height of 8000 feet. The final effort was made by the northern ridge, Mr. Green moving up the glacier on March 1st, and camping at the foot of Mount Tasman at an altitude of 7000 feet. At 6 A.M. on the morning of the 2nd, a start was made. The progress was slow, the glacier being thickly crevassed. As the peak was approached, considerable danger was incurred from

continual avalanches. Hanging glaciers presented themselves in nearly every hollow in the peak at greater or less elevations, from one or other of which masses of ice were almost continually falling and rushing down the steep mountain side. To avoid these avalanche lines was the great difficulty of the ascent, and at one point the danger seemed so great that the party had thoughts of relinquishing the undertaking, but they were fortunate enough to get safely past it and continuing the ascent, at 6.20 p.m. stood upon the summit of the main peak. The air was now full of clouds, and as little could be seen and the hour was so late, the descent was at once commenced, not more than ten minutes being spent on the top, near which a small stone cairn was hurriedly erected. A camera appears to have been taken up by Mr. Green, but there is no mention in his preliminary account of any hypsometric instruments, so that the actual height of Mount Cook may still remain undecided. The old Admiralty survey gives this as 13,200 feet, but the numerous trigonometrical observations on which the height of the mountain is based on the Government map of New Zealand result in 12,349 feet only. After descending some 2000 feet, darkness came on, and Mr. Green and his companions were compelled to spend the night on a narrow ledge of rock, without sleep or food, finally reaching their bivouac on Mount Tasman and their glacier camp in safety, after an absence of thirty-seven hours, of which the last twenty-two were foodless. The peculiar danger from avalanches was fully illustrated by the way in which the track made by the party in the snow in ascending was found next morning to have been obliterated by avalanches that fell during the night. The scenery about the upper part of the Tasman glacier and its branches is described as supremely grand, equalling, and even excelling, the most famous scenery in the European Alps. The peaks rise higher above the level of the snow-fields, and these are more extensive, and under the brighter and clearer atmosphere of New Zealand, present a more dazzling beauty. The spurs of Mount Cook, below the snow-line, were covered with plants which reminded the travellers of the Alpine vegetation of Switzerland. Among these was a *Gnaphalium*, closely resembling *G. leontopodium*, the well-known "Edelweiss."

Proposed Memorial to Mr. Charles Darwin.—A committee has been formed in order to obtain the means of commemorating the late Mr. Darwin by some permanent memorial. The exact form of this is left for future decision, as it must depend to a considerable extent upon the amount subscribed, but it has been determined that there shall be a personal memorial of some kind, bust or statue as may be hereafter approved, and a fund the proceeds of which shall be devoted to the furtherance of scientific work and associated with the name of Mr. Darwin. Mr. John Evans, Royal Society, Burlington House, is the Treasurer.

CORRESPONDENCE.

Snow-clad Peaks in the Mozambique Region.

H.B.M. CONSULATE, MOZAMBIQUE, March 14th, 1882.

I have just read in the 'Proceedings of the Royal Geographical Society' for February, an interesting account of a journey made through the Makua and Meto countries by Messrs. Maples and Goldfinch of the Universities Mission, at the same time that I was travelling in the Lomwe country.

In it Mr. Maples speaks of a "snow-clad mountain, Irati," upon the existence of which he appears to have received so much native evidence that he states he "does not doubt the truth of the native story." It is but just to the memory of the late consul Elton that I should point out that to him is due the first mention of the mountain "Erado," no doubt the same, in the Makua country abreast of Mwendazi Bay. Consul Elton, in his report to the Foreign Office of January 3, 1877, speaks of it also as a "hill settlement" whence coffee came, alluding then, doubtless, to the villages at its foot. But although he passed within thirty or forty miles east of the hill he heard nothing of its being snow-clad.

From my camp at Karoa, where I was detained three days, this hill Eradi was clearly and distinctly visible, and I am therefore able to speak with certainty respecting it.

As fearing to lengthen my paper I made no mention of this hill, simply laying it down in my map, I now quote from my rough journal.

"Nov. 3.—From the door of my tent the hills Eradi and Mwaja are very conspicuous and clear. The former, which doubtless is the one mentioned by Elton in his coast journey, is a very bold and striking hill, bearing N. by E. half E., and is about 3000 feet in height."

Anxious not to overestimate my heights, I may perhaps have slightly underestimated this one; but I have little hesitation in saying that it will not be found to be over 4000 feet above the plain or between 5000 and 6000 feet above the level of the sea. The native report that it is snow-clad is certainly inaccurate.

H. E. O'NEILL.

Longitude of the Salween.

37, EDGWARE ROAD, W., 29th April, 1882.

With reference to my letter to you on the sources of the Irawadi and Brahmaputra rivers ('Proceedings,' May, p. 317), I find that I made an error in reducing from the Peking to the Greenwich longitudes in the position of the Salween as plotted by the Jesuits; the paragraph should read:—"We may here note that the Salween has been depicted by the Jesuits crossing lat. $27^{\circ} 10'$ in long. $98^{\circ} 56'$; lat. $26^{\circ} 30'$ in long. $98^{\circ} 51'$; and lat. $26^{\circ} 0'$ in long. $98^{\circ} 49'$."

HOLT S. HALLETT.

The Elephant Experiment in Africa.

64, ST. GEORGE'S SQUARE, S.W., May 7th, 1882.

With reference to the paper in the 'Proceedings of the Royal Geographical Society' for May on the experiment of Indian elephants in Africa, it is as well that it should be understood that, if only the necessary trouble be taken, African elephants can be made as useful as Indian.

1. In the treaty made by the Romans with the Carthaginians, B.C. 201, after the second war, it was provided that they should surrender "elephantos, quos haberent domitos, neque domarent alios."—*Livy*, xxx. 37.

2. In the paintings on Egyptian monuments, the elephants appear evidently tame.

3. Ptolemy Philadelphus founded the station of Ptolemais *Epitheras* (ἐπιθηρας) destined, as its name indicates, to be the station for expeditions to capture elephants, for his attention had been turned to the necessity of training African elephants as a counterpoise to the boundless supply of Indian elephants available to Seleucus. (See Bunbury, 'Ancient Geography,' i. p. 578.)

4. The elephants on Roman coins are unmistakably of the African species.

5. In the well-known inscription of Adulis in Abyssinia allusion is made to trained elephants. (Bunbury, 'Ancient Geography,' i. p. 609.)

We cannot doubt that the African monarchs made use of the elephant, and that there is no reason *why they should not be so made use of again*. The camel did not find its way to Africa till the time of the Arabs: perhaps the elephant is still destined to play an important part in Africa's history. At any rate, it should not be hastily assumed that the African elephant is behind his Indian brother in docility. Jumbo, of the Zoological Gardens, disposes of that idea.

That some of the hardy forest tribes could be trained to the management of elephants seems not unreasonable to suppose. If an establishment were opened at Zanzibar, two or three trained Indian elephants would soon bring young African elephants into order, and the system once started would maintain itself.

ROBERT CUST.

REPORT OF THE EVENING MEETINGS, SESSION 1881-2.

Ninth Meeting, 27th March, 1882.—The Right Hon. Lord ABERDARE,
President, in the Chair.

PRESENTATION.—*William A. K. Gostling, Esq.*

ELECTIONS.—*Arthur H. Crow, Esq.; William A. K. Gostling, Esq.*

The subject of the evening was a Lecture by Mr. E. O'Donovan, entitled—
"Merv and its Surroundings." (*Vide ante*, p. 345.)

Tenth Meeting, 24th April, 1882.—The Right Hon. Lord ABERDARE,
President, in the Chair.

PRESENTATIONS.—*C. L. Wragge, Esq.; E. C. Hore, Esq.*

ELECTIONS.—*Robert Ashton, Esq.; Major W. F. Badgley; Alfred Brookman, Esq.; Edward Hyde Hewett, Esq.; Henry Kent, Esq.; Charles William Pearson, Esq.; John R. Somerville, Esq., M.D.; Commander William Symington.*

The following paper was read:—

"A Journey in the Atlas and the Northern Part of the Algerian Sahara." By
Valentin de Gorloff. (*Ante*, p. 358.)

Eleventh Meeting, 8th May, 1882.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*David Boyle Blair, Esq.; Samuel Browne, Esq., M.D.; Henry Charles A. Conybeare, Esq.; William Brampton Gurdon, Esq., C.B.; Captain Henry M. Hughes; Henry Bret Ince, Esq., Q.C.*

The paper of the evening was—

"Surveys and Explorations in the Native States of the Malay Peninsula, 1876-82." By D. D. Daly, Superintendent of Public Works and Surveys, Selengor. Will be published in a subsequent number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—April 14th, 1882: M. VICTOR GUERIN, Vice-President, in the Chair.—A letter was read from the Geographical Society of Toulouse, announcing its formation, and stating that, whilst occupying itself with the study of geography generally, it will devote itself more especially to that of the regions of the Pyrenees.—The Commercial Geographical Society of Bordeaux forwarded the programme of the Congress of French Geographical Societies which it is intended to hold in that town from the 4th to the 9th of next September, during which an exhibition will also be held.—The new Geographical Society of Lübeck also announced its foundation, and its intention of issuing an annual record of its transactions.—A letter, dated February 8th, 1882, was read from M. Ladoulx, French Consul at Zanzibar, stating, among other items of information, that the chief of the Belgian station at Karema appeared uneasy at the progress of Mirambo, the conqueror of Sinaba, but that Mirambo had, it appeared, declared his intention of respecting and protecting Europeans, of whom he wished to make friends.—M. Gabriel Marcel, of the Geographical Department of the Bibliothèque Nationale, sent a written account of the recent acquisitions made by that establishment. He called especial attention to a number of maps, engraved and in MS., purchased in Amsterdam. Some of these are stated to be exceedingly interesting and very rare.—M. E. Eschbach, representative at Paris of the press of Netherlands India, forwarded, for the acceptance of the Society, a map, drawn by himself, of the Dutch possessions.—From Calcutta a French traveller, who does not wish his name to be published, sent a detailed and very interesting paper on Assam, in which he describes its natural riches, and predicts that in ten or twelve years it will be one of the brightest gems in the British crown.—A memoir was received from Mohammed Assan Khan, first interpreter of His Majesty the Shah of Persia, on the geography of the lofty plateau of Lar, situated to the north-east of Teheran, which has scarcely been noticed by geographers; and another, from General Colonieu, on the extensive and rich oasis of Figuig or Figig, at the eastern extremity of the Moroccan Sahara, to which were annexed a map of Ksurd and a plan of Figuig.—Donations were announced from M. Georges Revoil of a fine collection of photographs of the various types of Somali-land, and from M. Tumanof of some 250 important photographs from Central Asia.—M. Alfred Marche, the former companion of the Marquis de Compègne on the Ogowé, and afterwards of M. de Brazza and Dr. Ballay in the same region, who visited the Malay Peninsula and the Philippine Islands in 1879-81, has brought back with him 200 skulls and skeletons of individuals of ancient races, a collection of Negrito skeletons, 400 ethnographical specimens, such as vases, dishes, plates, armour, funeral urns, bracelets, trinkets, &c. His zoological collec-

tions include 1000 birds, belonging to 300 species, some entirely new, besides fish, mammifera, insects, &c. All these various objects are being exhibited in the Society's *hôtel*, and the exhibition, which is public, will remain open for a month. An account of M. Marche's journey will be published in the '*Compte Rendu des Séances*,' which will also contain a memoir by M. Antoine d'Abbadie, of the Institute, on the new map of Lake Tsana, drawn by the German traveller, Dr. Stecker, as well as some remarks on Lake Enara and the course of the Pasevik, forwarded by M. Georges Touchet, who is engaged on a scientific mission in the north of Europe, and the items of news furnished by Colonel Veniukof, concerning various Russian geographical enterprises and publications now in course of execution. The same correspondent also announces that M. Tillo is preparing a great work on the floods and inundations, in fact, the hydrography of European rivers. He is engaged in collecting information on the subject, and appeals for aid to all who can furnish him with useful materials.—It was announced that during the week the Ethnographical Museum had been inaugurated in the Trocadéro palace, and the Chairman called attention to the importance of the whole collection, and especially that part which has reference to America. M. Quatrefages, of the Institute, who contributed greatly to the establishment of the new museum, made some observations comparing it to that at Berlin, while Dr. Hamy, the Director, expressed his gratitude to those travellers who are making it richer and richer every day. The number of specimens, arranged in cases, already exceeds 12,000.—A letter was afterwards read from M. F. Le Play, a well-known author and engineer, written two days before his death, and referring to some points in a paper by M. Jules Garnier read at the last meeting, on the country of the Don Cossacks. M. Le Play had visited the country many years ago, and had described the rich oil basin long before M. Garnier, whose remarks on the absence of forest vegetation in the steppe he especially set himself to refute. The General Secretary, M. Maunoir, said that this letter, being in some sense M. Le Play's literary and scientific testament, would be most carefully preserved in the Society's archives.—Lieut.-Colonel Perrier, sub-director of the topographical service of the army in the Ministry of War, presented (i.) six sheets of surveys executed in Senegal by the topographical commission, and (ii.) several sheets of route-surveys in Tunis. The map of this region is now in course of preparation.—M. Dutreuil de Rhins read a *résumé* of a note on the map which he recently presented to the Society, and which shows the journey through Southern China in 1879 of Père Creuse, who has since been murdered. The provinces of Yünnan, Kwangsi, and Kweichow, are shown on the map in question.

—April 28th, 1882.—First Annual General Meeting: M. FERDINAND DE LESSERS, President, in the Chair.—The meeting was not held in the usual place, but in the great amphitheatre of the Sorbonne, and there was a large attendance of members and their friends.—The Ministers of Marine, of War, and of Public Instruction sent representatives, and among those present were also General Brière de l'Isle, formerly Governor of Senegal, Count Beust, Austro-Hungarian Ambassador, and Baron von Theilmann, First Secretary of the German Embassy.—The Chairman opened the meeting with a long address, in which he first observed how great an advance had been made in those studies which are the *raison d'être* of the Society's existence, as well as in the movement which the Society seeks to develop. The principal part of the address was devoted to Africa and the French explorers of that continent. After referring to Colonel Flatters' ill-fated expedition, M. de Lesseps spoke of Captain Bloyet and the observations made by him at the station of Kondon, which will shortly be published by the Society, and of M. de Brazza, whose early return to Europe he announced, which was only for the purpose of making the final preparations for an expedition on the Congo in company with Dr. Ballay. He also referred

to the mission of Captain Gallieni and the topographical reconnaissances of Major Derrien and Lieutenant-Colonel Borgnis-Desbordes. M. de Lesseps said he would like to see an expedition sent every year into these parts to make the natives understand that the French had no desire to attack them, and that their objects were peaceable and above all commercial. Passing next to the project for the creation of a sea in the Sahara, he said that it had just made a great step forward, thanks to the appointment of a Committee of Inquiry by M. de Freycinet, President of the Council. After an allusion to the canal through the Isthmus of Corinth, M. de Lesseps lastly referred to the Trans-Saharan Railway, the surveys for which had not been abandoned, and which the Society and the Government alike hoped to see accomplished. If ships traverse the sea, the locomotive, he said, must traverse the solitudes of the desert, the oases of which, like islands, will be its halting-places.—The conclusion of this address was hailed with loud applause, which was redoubled when the result of the ballot for next year's Bureau was announced, and M. de Lesseps was declared to have been re-elected President. Lieut.-Colonel Perrier and M. Antoine d'Abbadie, of the Institute, were elected Vice-Presidents; Dr. J. Montano and M. H. Cordier, Scrutineers; and M. Georges Revoil, Secretary. The following were elected members of the Central Commission:—M. Alphonse Milne-Edwards, of the Institute; M. J. B. Paquier, Professor of History and Geography; M. Vidal Lablache, Sub-Director of the Ecole Normale Supérieure; and Captain Louis Vignes, of the Navy.—M. W. Huber next read the report of the Committee of Prizes, which have been awarded as follows:—Gold Medal to M. Georges Revoil for his journeys in Somâli-land, 1878–81; Gold Medal to Dr. Oscar Lenz for his journey from Tangier to St. Louis, by way of Timbukta, 1879–80; Gold Medal to Dr. J. Montano (Logerot Prize) for his scientific explorations in Malaysia, 1879–81. The Jomard prize, given for the first time this year, was awarded to Professor Paul Gaffarel, of Dijon, for his works on Historical Geography. The reports on the various journeys which have deserved these rewards were read by their respective authors,—M. W. Huber (Revoil); Dr. Hamy (Montano); and M. Richard Cortambert (Gaffarel); but M. Rabaud, President of the Geographical Society of Marseilles, not being present, his report on Dr. Lenz's journey was read by M. Dunan. The different reports will all be published in the quarterly *Bulletin*. Count Beust, the Austro-Hungarian Ambassador, received the medal for Dr. Lenz.—The sitting was brought to a close by a communication from Captain Gallieni on his expedition to the Niger. This was a *résumé* in two parts of a more extensive memoir. The exploring expedition in question was sent to search for the means of reaching the great river of the Soudan, in order to open the way to military and commercial establishments, which are to ensure the safety of communications along the commercial route, projected by the French Government in this part of the Soudan.

— May 5th, 1882: Mr. HENRI DUVEYRIER, of the Institute, President of the Central Commission, in the Chair.—A letter was read from Dr. Harmand, French Consul in Siam, dated Bangkok, March 21st, in which he states his intention of shortly making a journey among the Chongs, who occupy a wooded and mountainous country to the north of Shantabun, previously unvisited by Europeans. Since his arrival, Dr. Harmand has already made a rapid journey on duty through the provinces of Ratburi and Nakkon, and he reports that Ratburi ought to be laid down on our maps much further to the north than at present.—In March last, M. Alphonse Pinart was among the Indians of the Central Sierra, Isthmus of Panama, who are called the Guaymis, a savage tribe, who detest the whites, and avoid all intercourse with them, though some Americans have lately traded with them on the coast of the isthmus. The traveller writes that he intends to visit the whole of the region known under the vague name of Talamanca, where

are found the Indian tribes living about the Chiriqui lagoon to the north, and those who dwell between it and the civilised part of Costa Rica.—News has been received of Lieutenant A. Gautier, of the Navy, who is engaged on a mission in the north of Cochin China. The Governor of the colony had directed him to go to the north from Bienhoa, and to strike into the interior of Indo-China as far as the latitude of Hué, returning by the China Sea. M. de Quatrefages read extracts from three long letters, which have been received from this officer. The first of these was written on February 21st on the banks of the Dongnai in about $11^{\circ} 25' N.$ lat., $107^{\circ} 23' 15'' E.$ long., in a village called by the inhabitants Angkiuh; the second on February 25th, some five or six miles from the right bank of the mouth of the Daué, which empties into the Dongnai; and the third on March 14th from the confluence of these two rivers and on the right bank of the latter. In place of going to the north according to his instructions, M. Gautier was obliged by his porters and carriers to take a north-easterly direction. He says that the appearance of the village of Angkiuh is singular, it being placed in an immense clearing outside the forests, and $2\frac{1}{2}$ miles in circumference. The village consists of nine or ten habitations, among which the traveller found only a single dog. The crossing of these forests was rendered very disagreeable owing to large scorpions and leeches, by which they are infested. The paths or roads are only good where the elephants have trodden them down; the country is said to be, indeed, the home of the elephant, and, besides, there are goats, deer, bisons of very large size, pheasants, monkeys, tigers, panthers, &c. Often there is only a single dwelling for all the inhabitants of a village, and when the family increases, a colony sets out to seek another establishment for itself. The men are fine and well-proportioned; the women are ugly, but admirably formed. The climate is very trying, the difference between the day and night temperature being the same as between summer and winter in France.—M. Gautier was assured that there was a road leading out of the basin of the Song-Dongnai; he did not, however, see this outlet, which is said to be in the direction of the Tien-lay mountains, or of those of Tro-Trá. Among the savages he has hitherto met with, one thing in particular has struck M. Gautier, viz. that they have been established in the valley of the Dongnai for a comparatively short period.—The General Secretary announced the formation of the Breton Geographical Society, founded at Lorient by naval officers, who are all members of the Paris Society, under the patronage of Vice-Admiral Amet, Maritime Prefect of Lorient.—Dr. Hamy, Director of the Ethnographical Museum, again referred to the progress of that institution, and presented the first number of the '*Revue d'Ethnographie*,' which he has just founded.—The remainder of the sitting was taken up with a discussion on the project for a maritime canal between Bordeaux and Narbonne to connect the Mediterranean and the Atlantic.

Swedish Geographical Society, Stockholm.—24th April, 1882.—This meeting was convened for the purpose of presenting Professor Nordenskjöld and Captain Palander with the *Vega* medal. At the request of the chairman, the King of Sweden handed the medal to Professor Nordenskjöld, alluding, in a few well-chosen words, to the achievements of the gallant explorer, whose last expedition had been brought to such a successful close on that very day two years previously by the arrival of the *Vega* in Stockholm; to which Baron Nordenskjöld responded, thanking the king for the double honour thus conferred upon him, and for his generosity in contributing to the expedition.—The *Vega* gold medal, which has been struck in honour of the exploration of the North-East Passage, will be conferred on men distinguished by their achievements in geographical discovery, irrespective of nationality, and represents on the reverse a female figure in sitting posture holding in her left hand, which rests on her knee, an oak wreath, and in the outstretched right hand a

laurel wreath, whilst her head is turned towards a boy who points to a terrestrial globe near him. Behind her is seen the sea, and to the left the *Vega* standing towards a mountainous land on the horizon. The inscription on the same is, "For geographical discovery," and underneath is the date of issue. The obverse bears the name of the receiver within a wreath of oak and laurel. The two specimens struck bear the names "A. E. Nordenskjöld, 1881, and Louis Palander, 1882."—After this ceremony was brought to a close, an interesting paper on the ornaments of the aborigines in some parts of the Pacific Ocean, viz. New Holland and New Guinea, was read by Herr Stolpe.

Société Khediviale de Géographie, Cairo.—March 10th, 1882: General Stone, President, in the Chair.—On the proposition of the President, Dr. Schweinfurth was unanimously elected Honorary Member of the Society in consideration of the eminent services he has rendered to African geography. M. Bonola, General Secretary, read the Annual Report, which dealt first with the financial and general condition of the Society, showing that it was satisfactory, and next passed in review the chief expeditions and geographical publications of the year 1881, dwelling especially on the practical importance of the Congress at Venice in September. M. Arbegues de Sostén, delegate of the Geographical Society of Madrid, then gave the Meeting an account of his journey in Abyssinia, from which he had just returned, describing its present social and political condition, and giving interesting details regarding a new lake, named Ardib, which he claimed to have discovered in the Wollogalla country, of which he submitted a sketch map.

—April 14th.—The General Secretary continued the reading of his Annual Report, reviewing in detail the geographical exhibition at Venice, and describing the sections Brazil, Greece, Argentine Republic, Canada, Italy, and Switzerland.—M. Zimmerman then read a note from Colonel Mason Bey on the subject of the nilometers that were required along the river above Berber and Khartum. General Stone supported Mason Bey's views, stating what had been done by the General Staff regarding the measurement of the Nile level. He concluded by saying that it was the duty of the Society thus to point out the public works which it considered necessary to be established in the country, in the interest of agriculture as well as of science.—M. Rossi Bey next read an itinerary by the Duc d'Aumont, who had ascended the Nile as far as the Beddin rapids beyond Regiaf in 1855, and which contained details of great interest regarding the state of the country at that period, which appears to us, after the many explorations of the last quarter of a century, so remote. General Stone pointed out the importance of the document as affording means of comparing the progress made since that day. The proceedings concluded with some remarks by Colonel Long Bey regarding the journey he had made in the same region twenty years after the Duc d'Aumont.

NEW BOOKS.

(By E. C. RYE, *Librarian E.G.S.*)

EUROPE.

Lock, W. G.—*Askja, Iceland's largest Volcano: with a description of the Great Lava desert in the interior; and a chapter on the Genesis of the Island.* Charlton, Kent (Author): 1881 [1882], 8vo., pp. 106, map. Price 3s. 6d.

The author visited Askja in 1878 and again in 1880, and now gives a description of his later journey and of the then existing condition of the rifts and lava beds in the Mývatn's Örafi, discussing also the nature of the eruptions in 1875. Among his mostly irrelevant criticisms of former Icelandic travellers

and their writings, those upon Mr. W. L. Watts may be here referred to, as claiming to give a more correct idea of the exact situation, magnitude, and appearance of Askja than is likely to be conveyed by the latter named traveller's description in our 'Proceedings' for 1876. The vast crater is now described as almost circular, over 17 miles in circumference, lying at a depth of at least 800 feet within a mountain built up, by the deposit of innumerable lava-flows round a volcanic vent, to the height of 2300 feet above the level of the Ódátahraun plain (3800 feet above sea-level), and subsequently heightened by upheaval of those deposits and of the substrata forming its outer circumference, which cannot be less than 24 miles with an altitude of 3500 feet. The mountainous periphery is broken by gaps to the present level of the floor of the crater in two places only. The claims of Hekla to be the most important of Icelandic volcanoes are considered wholly insufficient, and the most of the lava floods round it appear from their "lay" not to have come from its volcanic vent but from rifts above a subterranean channel supposed to be connected with the Askja crater.

The author believes (p. 91) that immediately following the disturbances of the glacial epoch a rift in the earth's crust extended from south to north under those portions of the island now known as the Vatna Jökull and the Ódátahraun as far north as Krafla, and that Askja is its present great central volcanic outlet, from which innumerable channels in the post-tertiary strata radiate.

The delineation of Askja upon the recent re-issue by the Icelandic Literary Society of Gunnlaugsson's map of Iceland, is with other orological features claimed to result from the survey made by Lieut. (now Captain) Caroe of the Danish Navy in 1876; this is reproduced with additions by the author on the map to the volume under notice (scale nearly 20 miles to the inch), which includes the Færöes, and shows recorded sites of volcanic activity, lava beds, routes, capabilities of accommodation, &c. An inset (scale 1 : 100,000) gives the crater of Askja with its eastern and western outlets.

Lock, W. G.—Guide to Iceland; a useful Handbook for Travellers and Sportsmen.

Charlton (Author): n.d., cr. 8vo., pp. 184, map. Price 5s.

Contains an introductory chapter of general information, a succinct account of Iceland, notes on sport, the capital and vicinity, descriptions of the available tours, and a few words on desert routes. The map is the same as that above noticed, with the addition of coloured routes.

ASIA.

India: North-Western Provinces.—Statistical, Descriptive, and Historical account of the North-Western Provinces of India. Vol. vi. Cawnpore: by F. N. Wright, B.A., B.C.S.; Gorakhpur: by E. B. Alexander, B.C.S.; Basti: by H. C. Conybeare, n.c.s. Edited by Edwin T. Atkinson, B.A., B.C.S., F.R.G.S. Allahabad (North-Western Provinces and Oudh Government Press): 1881, large 8vo., pp. lviii. and 797, maps.

It seems more fitting to introduce the notice of this continuation of a very valuable series (just received from H.M. Secretary of State for India in Council) by some notes on the earlier volumes, which have been issued at Allahabad at various dates, commencing in 1874. The idea of some such work was entertained so long ago as 1803 by the Court of Directors of the East India Company, with reference to the ceded and conquered provinces, but (without reckoning the general gazetteers of Hamilton and Thornton) it was not until Mr. Thomason in 1844 started the idea of a system of separate district memoirs that any practical work was done. This resulted in memoirs of Budaon, Aligarh, Cawnpore, and Fatihpur, all written previous to the mutiny; and the scheme was revived with additions in 1868, producing memoirs on the Bulandshahr District by Kuar Lachman Singh; Muthra, by Mr. F. S. Growse, c.s.; Dehra Dún, by Mr. G. Williams, c.s.; and the first part of Gházipur, by Mr. W. Oldham, c.s. The subject was definitely taken in hand in 1871, and queries based upon the Admiralty Manual of Scientific Inquiry were circulated among the district officers of an area of nearly

85,000 square miles, with a population (over 30,000,000) nearly equalling that of Great Britain and Ireland at the time. The resulting gazetteer is stated to be only intended for practical use as a work of reference, principally for district officers, and the antiquarian and historical notices in it are merely outlined enough for the purposes of civil administration; nevertheless there is not only much introductory material bearing on the physical geography of each district, but much detail is given bearing on zoology, botany (especially as to economic or medical bearings), agriculture, climate, native habits, languages, and tribal relations.

The following have already appeared; the first four volumes being under Mr. Atkinson's name alone, though assistance is freely acknowledged in each case as to details:—

Vol. I. Bundelkhand. 1874, pp. xv., 601, vi., and ix. Maps.

Vol. II. Meerut Division: Part 1. 1875, pp. iv., 612, xiii. and xii. Maps.

Vol. III. Meerut Division: Part 2. 1876, pp. iii., 740, iii., x., and ii. Maps.

Vol. IV. Agra Division: Part 1. 1876, pp. lxxx. (containing zoology and botany of the plains of the North-Western Provinces, by Mr. A. Anderson and Mr. G. King respectively), pp. 771, viii., and vi. Maps.

Vol. V. Rohilkhand Division: Part 1. [Budaun, Bijnor, Bareilly.] Compiled by H. C. Conybeare, n.c.s. 1879, pp. ix., 847, and xiv. Maps.

And Vol. VI. as in heading.

The different paginations in these titles refer to introductory observations, glossaries of vernacular terms, and nominal and general Indices.

The volume just received is perhaps superior to its predecessors in fulness, accuracy, and interest, the historical portion of the Cawnpore section being of course paramount in the latter respect. The index is especially full, rendering not only vernacular terms, but some of the more abstruse English expressions for the benefit of native readers. Each district is described in three introductory parts, 1, Geographical and descriptive (natural, political, and administrative boundaries, scenery, surface features, soils, saline deposits, water level, river systems, lakes and swamps, means of communication, distances, meteorology, and climate); 2, Products, animal, vegetable, and mineral; and 3, Inhabitants, institutions, and history; and local details are given in the usual alphabetical manner.

The maps of the three districts discussed in it (scale 8 miles to the inch) show chiefly administrative and traffic details.

Le Livre de Marco Polo.—Fac-simile d'un Manuscrit du XIV^e. Siècle conservé à la Bibliothèque Royale de Stockholm. Photolithographie par l'Institut Lithographique de l'Etat-Major. Typographie par l'Imprimerie Centrale. Stockholm: 1882, sm. 4to. (*Quaritch*: price 3*l.* 3*s.*)

Baron Nordenskiöld has here given in photolithography a facsimile (of which only 200 copies have been printed) of one of two manuscripts of Marco Polo preserved in the Royal Library of Stockholm. The original, written on parchment, is very slightly imperfect, and bears some partially cut down Latin notes, having also on its last page a world-projection, accompanied by some old Latin text by the same hand as the notes, and not quite correctly reproduced in Santarem's Atlas and "Essai sur l'histoire de la Cosmographie." The MS. was first noticed by George Stephens in 1847, and a history of it is given in the preface on the authority of Léopold Delisle: it is attributed to a period not later than the middle of the 14th century, and is traced as being part of the collection of Charles V.

Richtshofen, Ferdinand [Freiherrn] von.—China. Ergebnisse eigener Reisen und darauf gegründeter Studien. Vol. ii. Das nördliche China. Berlin (Reimer): 1882, 4to., pp. xxiv. and 792, maps, coloured frontispiece, geological profiles, and woodcuts. (*Dulau*: price 1*l.* 11*s.* 6*d.*)

The first volume of this great work, though published so long ago as 1877 (before the present scheme of our 'Proceedings' permitted notices of new

books), may nevertheless be here briefly referred to, more especially as it has as yet found no English translator. Of about the same bulk as vol. ii. (containing pp. xlv. and 758, with an index which does not accompany vol. ii., and many maps and woodcuts), it is perhaps of more general interest, containing, after some introductory explanations on orthographical points, &c., a sketch of the author's travels in China, with notices of subsequent publications. These travels extended over four years in China and Japan, Baron Richthofen having personally visited all but four of the provinces of the former Empire, which he crossed from Canton to Mongolia, and from Shanghai to Ching-tu. The body of the work is comprised in two sections, of which the first discusses China in its relations to Central Asia, and the second is an historical outline of the development of our knowledge of the Empire. The first section is subdivided into chapters treating of:—(1) Central Asia as a whole, with special reference to its distinguishing feature of a great central plateau, to which is applied the Chinese name of "*Han-hai*," supposed to be the old bed of a vast inland sea. This dried up basin with its enclosing ranges includes the Gobi desert on the east, and Eastern Turkistan or the Tarim basin on the west, and practically extends the true axis of the Asiatic continent further towards the east than theoretical geographers have hitherto placed it. (2) The "*Löss*" formations in North China and their relations to Central Asia, especially as regards change of climate and consequent development of agriculture. (3) The formation and breaking up of the Central Asian saline steppes, which formerly are held to have included all North-Western China. (4) Details of the land in the zone of transition from the above causes in Central Asia. (5) The distribution of similar regions in other parts of the earth which are without outlet to the sea and present the "*Löss*" formation. (6 and 7) The great mountain chains of Central Asia, the Thian-Shan and Kuen-Lun. The numerous maps (which show the directions and different degrees of the great mountain systems by dark central lines of various types instead of the conventional hill work) exhibit the author's routes, the strongly marked features of physical geography, pilgrim and trade routes in different ages, distribution of population at various epochs, &c.

The 2nd volume is devoted to Northern China, after a general sketch of the Empire of 18 provinces as a whole, and is divided into 3 sections, (1) Southern Manchuria, (2) North-eastern China, the provinces Shantung, Chili, Shansi, and Hōnan, and (3), North-western China, the provinces Shensi and Kansu. The general sketch of Southern Manchuria (which includes a notice of the literature on the region) is followed by detailed geological observations made during the author's various journeys; and the like treatment is extended to the north-eastern and north-western provinces above named, in separate chapters. The physical geography of each of these is described, with the distribution of economic mineral products in them, and their climate, inhabitants, trade, agriculture, &c., with especial reference in each case to the influence of geographical elements.

The volume concludes with a special geological chapter, describing the phases of the developmental history of North China, the operation of exterior agents, abrasion, and other phenomena, and an account of the coal-fields of Northern China. It is illustrated by a clearly executed coloured general map of the region (scale 1 : 3,000,000) showing the physical differences of superficies, routes, &c., and by another of a practically geological nature; also by many geological profiles, woodcuts, &c.

It is proposed to complete this truly original and great work in two more volumes, of which the last (vol. iv.), containing the paleontology, will be published next after the first part of the Atlas, which will contain 14 orographic and as many geological map-sheets, referring to North China, and is hoped to appear in six months (preface dated September 1881). Vol. iii., with the remainder of the Atlas and the general Index, will be published after a longer interval: it will contain Southern China and some connected East Asian regions, and be accompanied by some large landscape views from Baron Richthofen's sketches, and a map of China as a whole.

AFRICA.

Paulitschke, Philipp.—Die Afrika-Literatur in der Zeit von 1500 bis 1750 n. Ch. Ein Beitrag zur geographischen Quellenkunde. Wien (Brockhausen und Bräuer): 1882, 8vo., v. and 122. (*Grevel*: price 4s.)

This valuable bibliographical contribution to geographical science by the author of 'Die geographische Erforschung des Afrikanischen Continents von der ältesten Zeiten bis auf unsere Tage' (whereof a second and larger edition is now published) is divided into two sections:—(1) A dissertation on the acquisition and digest of a geographical knowledge of Africa from A.D. 1500 to the time of D'Anville, including a special list of thirteen works on the Nile from 1552 to 1698; (2) A list of the literary works touching Africa from A.D. 1500 to A.D. 1750, including such manuscripts only of books or maps as are new or of practical worth, and divided under General, North, West, South, and East Africa, in each case arranged chronologically. 1212 books, memoirs, maps, and manuscripts in all are recorded.

GENERAL.

Fiorini, Matteo.—Le Proiezioni delle Carte Geografiche. Bologna (Nicola Zanichelli): 1881, 8vo., Text, pp. xliii. and 703, and Atlas, pls. xi. (*Dulau*: price 20s.)

An historical review with mathematical analysis of the various schemes of map projections, in which the impossibility of arriving at any universally correct plan is practically admitted.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

Cerri, C.—Carta stradale e postale dell'Italia, disegnata secondo le carte e le opere più accreditate dei moderni geografi 1: 864,000 or 11·8 geographical miles to an inch. Nova ed. dell'anno 1882. Wien, Artaria & Co. 8 Sheets. Price 16s. (*Dulau*.)

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PROCEEDINGS
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ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

*Surveys and Explorations in the Native States of the Malayan
Peninsula, 1875-82.*

By D. D. DALY, Superintendent of Public Works and Surveys, Sélângor.

(Read at the Evening Meeting, May 8th, 1882.)

Maps, p. 456.

THE Native States may be described as provinces in the Malayan Peninsula that are under the immediate rule of native princes; some of whom act under the advice of British officers accredited to their courts, some pay tribute to the King of Siam, and others are quite independent of either British or Siamese control.

The question as to the policy of British interference in the internal government of these States does not come within the scope of this paper; but it may be sufficient to state that it was forced on the Government of the Straits Settlements in 1873-1874, in consequence of internecine wars that threatened the trade, peace and security of the neighbouring British possessions of Singapore, Malacca, Penang and Province Wellesley. Many of the victims of these disturbances were Malays and Chinese who were naturalised British subjects. Piracy was rampant at sea; plunder, murder, and rapine were triumphant on shore.

Since the days of Colonel Low, Lieutenant Newbold, and Mr. J. R. Logan, little or no addition appears to have been made to the exploration of these obscure provinces; and until the last few years a common impression prevailed that one half of this terra incognita was a malarious marsh, and that the other half was a vast jungle inhabited by wild beasts, and that the seaboard was infested by pirates.

The coast-line had been laid down on charts by the Admiralty, when I had the honour of being appointed surveyor for the Native States by His Excellency Sir Andrew Clarke; and in May 1875, I was deputed to commence a rough topographical survey of the State of Sélângor.

Klang was at that time the capital of Sēlāngor, and it is situated in lat. $3^{\circ} 3' N.$ and long. $101^{\circ} 29' 30'' E.$ on a river of the same name. It is at the head of the navigation for vessels drawing 13 feet of water, and a fort garrisoned by Malay police commands the river. Leaving Klang, the river winds through rich alluvial deposits, covered with primeval jungle on either side, low lands admirably adapted for sugar, rice, and other low-land products. At a distance of 18 miles up the river, and at the head of the navigation for steam-launches, there is a village called Damarsara, whence there was a jungle track—18 miles in length—through an undulating country to the town of Kwala Lumpur. The soil on the rises consisted of ferruginous red and yellow clays, and the valleys contained black soil mixed with a little sand.

Since the British protectorate was established in Sēlāngor, this track has been transformed into a fair country road, fit for carriage traffic. It is overshadowed by magnificent timber, and plantations of tobacco, tapioca, and rice-fields have been opened. At the time when I surveyed this track, it was considered unsafe for wayfarers, as gang robberies were rife, and man-eating tigers infested the junglo. Since the road was made these evils have vanished, and travelling is more secure than in many more civilised countries.

The town of Kwala Lumpur, in 1875, was under the local administration of a Chinaman, Yap Ah Loi, known as the Capitan China, to whose enterprise and energy were due its progress and good order. From its central position in the state, and its proximity to numerous mining properties, Kwala Lumpur has now become the most important mining *entrepôt* in the state; and in 1880 the headquarters of the British Resident and staff were moved from Klang to this town. Situated at the junction of the river Klang and the river Gombah, this is the furthest point that cargo-boats can reach, and these boats, having discharged their loads of rice, salt fish, and other commodities for the tin miners, return laden with slabs of tin, gutta, and other products, to Klang, for shipment to Singapore, Malacca, or Penang.

From Kwala Lumpur my surveys radiated in many directions, fixing the position and jungle tracks thereto of the principal tin mines; and a glance at the map will show the position of various mining settlements which I reached, namely, Kanching, Ulu Sēlāngor, Ulu Bernam, Ulu Gombah, Ulu Klang, Ulu Langat, Sungie Puteh, Recko, Kajang, and intermediate places. The position of these places was quite unknown up to this date; and if I now describe one of the tin mines and its geological features I may say that I have described them all, merely intimating that the depth of the alluvial deposit over the thin layer of ore varies in different mines from 8 to 50 feet from the surface.

The large tin mine at Ampagnan, now giving employment to over 1000 Chinese, is situated about seven miles to the eastward of Kwala Lumpur, at the foot of the high ranges that form the backbone of the

Malayan Peninsula. This range rises up to 7000 feet, and is a continuation of the great Asiatic band that, commencing in the Himalayas, loses itself in Johore, the most southerly point of the Asiatic continent. There is no general name given to the ranges by the Malays, but the different ranges are recognised by Malay names which usually denominate the source of different rivers, such as "Ulu Klang," the head of the Klang river, "Ulu Sēlāngor," the head of the Sēlāngor river. The same mode of naming the hills prevails more or less from Siam to Singapore.

From these ranges the alluvial detritus is washed down, and at Ampagnan it varies from 20 to 35 feet in depth from the surface. Beneath this is deposited the layer of ore or wash, which varies from 4 to 30 inches in thickness. In some mines, the wash has been found to be from 6 to 10 feet in thickness, owing to its having been mixed up in pockets and nests with friable clay, all of which is passed in the sluices.

The layers of ore frequently run in circles, varying from 100 yards to half a mile in diameter at the foot of the ranges, and seem to indicate that when the great volcanic upheaval brought down and shed the ore from the matrix in the ranges, it was carried down in great floods, and wherever an obstacle such as hills or rocky ground opposed the course of the current eddies were formed, which worked round and round until the pent-up waters found an exit, depositing the heavy atoms of tin ore in concentric lines. The waters having surmounted the obstacles then made for the sea-coast—distant about 25 miles—leaving the tin in isolated patches along its course. The direction of this old river course is now eagerly sought by the Chinese, and owing to more recent volcanic disturbances it is frequently covered to a considerable depth and followed with much difficulty.

In the Batang Padang district in Pērak, there is a mine where the Chinese are following the tin on a hill side, and the layer runs up the hill in an undulating stratum, many feet above the surrounding tin deposits on the flats. This was no doubt caused by some extraordinary volcanic upheaval of recent date, which lifted the layer to its present elevation. The tin ore at Ampagnan is found lying in a blue or whitish clay and sand, and it is mixed with quartz, gravel, and blue pebbles; the overlying deposit being a white and yellow sand, with a thin stratum of clay and humus at the surface.

The output of these mines varies very considerably. At Ampagnan, which is a fair average of a successful tin mine, it is calculated that the yearly return comes to 2½ bharas (native measure) of white smelted tin extracted per man. This quantity at the rate of 70 dollars per bhara would be worth 175 dollars, or, in English weight and money, 1000 lbs. weight of tin, at a value of 35*l.* sterling, extracted by each coolie on the mine in the twelvemonth. A small percentage of gold is found in the tin at Kanching and Ulu Klang, in Sēlāngor, and also in Pērak.

Pumping machinery from Europe has been introduced with much advantage by the Chinese, and the Government each year devotes a portion of the surplus revenue to road and bridge making, and to improving the jungle communications between the mines and the sea-ports.

This cursory account of a tin mine may be of interest, as the alluvial tin deposits permeate the whole length of the Malayan Peninsula on the western side of the dividing range, and also because until lately the revenues of the Native States depended in a large measure on the duties collected on the exported tin. I say until lately, as rice-growing, coffee-planting, and other sources of agriculture have only commenced to yield a land revenue since British intervention afforded protection to the tillers of the soil.

The low lands that fringe the coast of Sélāngor are partly covered with mangroves, which grow in heavy clays and blue mud. These lands have been found in Province Wellesley to be well adapted, after drainage, for sugar plantations: whilst the mangrove trees that are cleared off are turned to profit to the planter by being cut up into lengths for firewood.

Leaving the mangroves, undulating country is met with, with elevations varying from 100 to 800 feet in height, and extending as far as the high dividing ranges of the peninsula. These rises are composed of red clay, shales, sandstones, granitic and felspathic rocks. Many of these rocks are mistaken for granite, but from their properties they more correctly belong to the order of syenite. Containing large proportions of felspar and hornblende, their decomposition continues with facility and rapidity, more particularly where they are exposed to the action of water lying below the surface. In road-cuttings and in wells, the different shades, according to the age of the syenitic clays, are well displayed, the whole being impregnated with mica. On the surface, extensive deposits of laterite in red clays, similar to those in the tropical parts of Australia, are found, and afford good metal for roads.

Rice-fields extend along the fertile valleys that separate the spurs of undulating hills, and the Malays irrigate their padi-fields in a primitive way. Sago trees grow well in the wet lands. On the rises, the dry padi (*padi omar*), which does not require irrigation, flourishes; and gambier, pepper, and tapioca plantations exist in isolated patches. On one plantation near Kwala Lumpur there are upwards of two thousand acres under tapioca, with the most approved European steam machinery and factory processes for converting the tapioca roots into the marketable article.

As we recede from the sea, the lofty dividing ranges come next. These vary from 800 to 7000 feet in height. Granitic rocks chiefly prevail here, and sandstone and plutonic rocks that have been subject to aqueous and atmospheric changes. The soil is of a light red and yellow

clay, not long decomposed from the rocks in situ, with an incumbent vegetable mould or humus from 8 to 12 inches thick on the surface.

There are no Malay settlements or plantations on the high hills, which are covered with primeval forest; and I briefly allude to them with a hope that the information may be of use to the coffee planters of Ceylon and other countries, some of whom have already opened plantations in Sēlāngor at an altitude of 2500 feet, and whose experience in other climes has favoured the belief that these hills are well suited for *Coffea arabica*, chinchona, ipecacuanha, jalap, tea, &c.; and they have hitherto been most successful on the lower lands in rearing young plants of Liberian coffee, cocoa, sago, and other tropical products. The rainfall averages about 130 inches per annum, and due provision is made in the leases to prevent the wholesale felling of timber on the summits of hills, such denudation having very much affected the rainfall in India, Australia, and other countries. Planters need have no fear of droughts, as the rains are general throughout the year.

Land can be purchased on terms of deferred payments at the rate of two dollars per acre. Roads are in course of construction by the Government up to the ranges, and the question of the labour supply in this virgin timbered but sparsely inhabited country has been warmly taken up by the Governor of the Straits Settlements, Sir F. A. Weld, with a view to procuring coolies from the over-populated districts of India. Every facility and assistance are rendered to land selectors by H.B.M. Resident of Sēlāngor, Bloomfield Douglas, Esq.

There are isolated hills of limestone varying from 80 to 1000 feet in height in various parts of Sēlāngor and in Pērak, but they are much scattered. Further researches in the unexplored mountains on the borders of Pahang, Tringāno, Kēlantān, and Rāhang may yet prove that these insulated rises are connected in a chain more or less broken.

The limestone caves at Batu in Sēlāngor are justly famed for their beauty and extent. One cavern has been traced for a distance of a quarter of a mile, whilst the height of the dome of another chamber is 355 feet from floor to roof, and like other limestone caves it is richly adorned with stalactites and stalagmites. Thousands of tons of bats' manure lie imbedded therein, a valuable fertiliser at hand for future planters.

This limestone formation trends in a broken ridge towards the high ranges, when the limestone very perceptibly alters its condition, and it is then found on the surface in a state of broken crystals of a dentiform structure. Beneath this stratum the rock has, through metamorphism, changed itself into a white or variegated architectural marble, much resembling quartz. The soils surrounding this range are correspondingly poor, bearing evidence of the rock destruction that ensued to the period of uplift. On the other hand, the limestone at the Batu caves is rich as an earth-producer and also yields valuable lime; whilst the same band of

rock as above described, which is situated at Ulu Klang, about eight miles distant, is worthless for either purposes.

In July 1875, the Governor, Sir W. F. D. Jervois, deputed me to explore the Moar river; and, after fixing the position of the interior unexplored states, I was to find my way across the peninsula to the mouth of the Pahang river on the China Sea.

Leaving Malacca in a Malay prahu, and equipped with surveying instruments, condensed provisions, and a party of Malays, we ascended the Moar river. His Highness the Maharajah of Johore had been good enough to favour me with letters to the principal Malay rajahs, who afforded me every assistance, but who warned me that the Malays would prove hostile to our entering the Negri Sumbilan or Nine States. These petty states had hitherto held aloof from all control or advice from either British or Siamese Governments, and their relative positions and internal management were unknown.

It was most important to ascertain the position of their boundaries, some of which were conterminous with the British territory of Malacca. These boundaries were vaguely fixed by the Malays, there were few definite points, and in reply to inquiries I received answers such as these, "The boundary of our State extends as far as the meeting of the fresh water with the salt water of the river;" or, "If you wash your head before starting, it will not be dry before you reach the place;" or, "The boundary may be determined on the river, as far as the sound of a gunshot may be heard from this particular hill." The shot might be fired from a smooth-bore, or from a twelve-pounder; or a gale of wind might carry the report much further than was contemplated. These ambiguous phrases were calculated to mislead, but they are essentially Malay in their *laissez-aller* generality.

The latitudes of the south head of the Moar river mouth I made by observations to be $2^{\circ} 0' 43''$ N. The longitude is $102^{\circ} 35'$ E. The width of the river at the mouth was three-quarters of a mile, and I found four feet of water on the bar at low water, spring tides. Mangroves hid the view on either side for a few miles, till we reached a young settlement at Pankalan Bukit. This was founded and tilled by a colony of Javanese, who had planted coffee (*Coffea arabica*), tobacco, Indian corn, and some 30,000 pepper trees. Soil—a light ferruginous red and yellow clay, mixed with sand. Rocks—sandstone and granite.

At another stopping-place on the river, called Bukit Kěpong, there was a hill planted with *Coffea arabica*; but there were very few clearances on this river till the Segámat river was reached, at the head of which are situated some gold mines, worked in the alluvial, only by Malays and Chinese. The gold-dust extracted was of a rough, shotty nature, and, not being much water-worn, had evidently not travelled far from the matrix.

The river Moar now narrowed considerably, and was quite over-

arched in places by tangled brushwood, bamboos, and rattans. All the rivers that I have explored in the Malayan Peninsula become rapidly shallow when the limit of the tidal influence is passed, and the ascent of the remainder of the Moar river was accomplished by driving the boat against the current by means of poles.

Large herds of elephants roam about the Moar river, and we frequently heard them trumpeting on the banks close to our boats.

From a place called Klubi I surveyed a track, all through dense jungle, that led to the Chindrass gold mines, near Mount Ophir. Here the Malays still wash out gold-dust excavated from gravel deposits; and they sink short shafts, out of which they get small blocks of stone, which they rudely crush with pestle and mortar, and wash out at a neighbouring stream. The deepest shaft was only 100 feet, and a lode has not yet been discovered. The gold is only found in detached leaders and saddles.

The highest point of navigation for shallow boats on the Moar river is at Kwala Jumpole; and from this point my surveys radiated as far as safety was practicable, for the Malays frequently hindered my progress, and were much opposed to my entry into the Negri Sumbilan.

Following up the fertile valley of the Moar, I passed through most picturesque country. Large rice-fields, from a quarter to half a mile in width, studded with Malay huts and gardens, and flanked on either side by densely wooded ranges, extended for many miles along the valley. These rice-fields were carefully irrigated by water-mills that were curious in their simplicity. A large wooden wheel revolved with the force of the stream current. Around the wheel hollow bamboos in short lengths were adjusted; these filled as they dipped in the water, and emptied themselves into a trough as the wheel went round. From the raised trough, the water was distributed by bamboo gutters to different plots of padi. These water-mills carried on their simple work of lifting the water without any personal supervision.

On arrival at a place called Gumatie, in this beautiful country, I was suddenly surrounded by about 30 armed Malays, who took me prisoner and threatened my life. I refused to give up my revolver, and after a detention of some hours I was released. My Chinese servants were, however, detained and starved for two days and two nights, and sent back to me without any clothes.

The natives of these states were determined not to allow me to pass through their country. They fancied that there was some occult design in my mission beyond the mere, to them, unmeaning occupation of looking through a telescope and sketching in hills, rivers, villages, and valleys. The Datoh of Moar, an influential rajah in that part, said of me, "If we let the needle in, the thread is sure to follow," meaning that, if an Englishman was allowed to enter their country, British annexation would be the natural sequence.

I turned back most unwillingly, though not without having added considerably to our geographical knowledge of this part; and I then directed my course through the unexplored country of Pahang towards the China Sea. On a stream called the Sungie Jumpole I found a strip of land, called Penarri, that separated the eastern and western watersheds of the Malayan Peninsula by a quarter of a mile only; and having with some difficulty procured the assistance of some friendly Malays, my boat was carried overland, and launched in the stream, the Sungie Sureting, which is a tributary of the Pahang river.

The Sungie Sureting is a shallow stream, much obstructed by fallen timber, and necessitated much wading in dragging the boat over obstacles. After a couple of days the river deepened, and we found ourselves in a large lake called Tassek Běrá. This is a shallow lake, with large timber growing in the water. Since our departure from the Sungie Sureting, no Malays had been met with; so that it was a relief here to come across parties of "Orang Jacoon," sometimes called "Orang Sakei," or wild men of the interior. They fled on our approach, but some more venturesome of their number brought us some fish for barter. They placed no value on money, but accepted clothes and tobacco. These wild people lead a gregarious life, seldom remaining long in one place, for fear of their wives and children being kidnapped by the Malays. They had resting-places in the trees, often 20 feet from the ground, so as to be out of reach of tigers and other wild animals. I was informed that they were very numerous in these remote parts,—the "Ulu Pahang" (interior of Pahang). There was little attempt at cultivation on the banks of the rivers, but I saw clearings on the ranges where they grew dry padi and Indian corn. They live on fish and on mammals or birds that they kill with the sumpitan (blow-pipe). In warfare they blow poisoned arrows through the sumpitan with great dexterity.

The lake Tassek Běrá was about two and a half miles wide where we crossed; it is said to trend to the eastward for four days' journey in boats. From this lake we emerged into a larger river, the Sungie Běrá, 130 yards wide and 20 feet deep, which falls into the Pahang river.

The principal rocks in this country are sandstone conglomerates and granite. The soil is a light yellow clay, mixed with sand on the rises, which are covered with dense forest that totally obscured the view.

The river Sungie Běrá falls into the Pahang river at a distance of about 180 miles, by river, from the China Sea. Here the Pahang is about 300 yards wide, and in the narrow channel which serpentine through the sand-banks we found 80 feet of water in places. Numerous well-populated and thriving villages lined the banks on either side, and the people were friendly and willing to give us information about the country.

It would be tedious to recapitulate all the field notes of this expedi-

tion, as the map denotes the position of different places that I fixed; but I may mention the names of some of the more important villages. These were, Kanow, Puchong, Pokoh, Batu Poho, Serei, Kenning, Sumbei, Sintang, Moussay, Nyia, Telok, Kretow, Gnau, Serampai, Kwala Chikoh, Saggie, Teumyong, Limpoy, Kanchei. These nineteen villages contained about 2110 houses, with an approximate population of 4330 Malays. Provisions were cheap and the land very productive. In the gardens and plantations all the ordinary varieties of tropical products were growing luxuriantly, such as coco-nut trees, *Coffea arabica*, padi, Indian corn, plantains, tobacco, clove trees, &c.

Small silver coins of the Straits Settlements or India were unknown, but the dollar obtained currency. The tin extracted in the country is used as coin, the tin being flattened out in square pieces and stamped with the Bandaharah of Pahang's seal; the centre part is raised or bulged, through which a hole is drilled and the pieces of money of the value of one penny or twopence are carried on a string. The change for a dollar is consequently heavy and cumbersome.

Gold is the principal metal, though tin mines similar to those in Sélāngor are worked with profit. The gold is found in alluvium, and washed out by Chinese and Malays in a rude manner. No attempt has yet been made to work gold in quartz, nor has any European machinery for either crushing or pumping purposes as yet been introduced. I was informed that there were 6000 Chinese working alluvial gold mines in different parts of the interior. Some Chinamen whom I met said that they had to pay exorbitant royalties to petty rajahs in the far interior, and that they were so "squeezed" by successive rajahs on their way to the coast, that they derived but little profit from their hard-earned and risky labour. At that time all the gold was supposed to be sold to the Bandaharah, who paid a standard value according to his own estimation, or rather inclination.

The Bandaharah of Pahang, whom I have mentioned, is the ruler of the country. The word "bandaharah" signifies "treasurer," but he is virtually the sultan. Well disposed towards the British Government, and anxious to develop the resources of his rich territory, he is notwithstanding much controlled and overruled by the counsels of more powerful rajahs. Every year he sends a rose of solid gold and another of silver to the King of Siam as the tribute of his state. He received me hospitably, stating that I was the first white man who had visited his country from the interior, and after spending four days of a very agreeable visit to him at Pekan, the capital of Pahang, I embarked in a Malay prahu, and after nine days' beating against a south-west monsoon, safely reached Singapore on the 9th of September.

Towards the end of 1875 I was directed to make a rough survey of the principal routes and rivers in the State of Sunjje Ujong, where the late Captain Patrick J. Murray, R.N., had been appointed British Resident,

and whose name will always be associated with the early progress and good government of this protectorate.

The rivers Linghy and Lukut, jungle tracks from the seaboard to the towns of Rassa and Serembang, the tracks between Sungie Ujong and the State of Sēlāngor on one side and the Negri Sumbilan on the other, were laid down on the map at various times, though not without some hardships and difficulties. The country was in a disturbed state, and was invaded by the people of the Negri Sumbilan, who were finally driven back with the assistance of British and Goorkha soldiers.

The geological formations are very similar to those described in Sēlāngor, the undulating lands receding from the sea till they culminate in the lofty ranges which are a continuation of the main ranges of Sēlāngor.

The revenue at that time depended entirely upon the export of tin, always a precarious and fluctuating source. Since the advent of peaceable times under British order, agriculture has made great strides, and the land now yields a revenue formerly unknown. Whilst tapioca, cocoa, and Liberian coffee have been grown with success on the lowlands, the hills at an altitude varying from 2000 to 3000 feet have been planted in a few estates with *Coffea arabica*, tea, jalap, chinchona, and ipecacuanha by the Hon. R. Beauchamp Downall, Hon. Martin Lister, Messrs. Thomas Heslop Hill and W. Kay, whose enterprise as pioneers deserves a continuation of the success which they have hitherto attained.

Taking the order in which the topographical surveys of different states were conducted by me, Pêrak was the most extensive, as it was, in point of revenue, the most important province.

The British troops were in the occupation of Kinta, in 1876, when I was deputed by Sir W. F. D. Jervois to fill in the large blank which represented Pêrak on the map. Hitherto the surveys had been carried on in accordance with the Governor's instructions, namely, to fix approximately and with as little delay as possible the position of rivers, hills, strategic points, forts, and stockades in these disturbed countries. The work was principally accomplished by prismatic compass bearings, and measurements that were carried on from points previously fixed by latitudes taken at night time with the sextant and artificial horizon, and the longitude of which was approximately determined by azimuth bearings to points fixed by the Admiralty surveying vessels on the coast.

Travellers in the East are well aware of the difficulty of surveying in jungle tracts; and it was with a feeling of relief that an open stretch of country presented itself at Kinta, whence a good view of the ranges of Tringāno, Pahang, and of the prominent hills of Pêrak stood in bold relief. A base line, three miles in length, was carefully measured by me near Kinta, and the distances and altitudes of ranges, some of which were upwards of 8000 feet in height, were calculated and recorded in

the map. The Kinta river is one of the longest navigable tributaries of the Pêrak river, enabling the Chinese miners to export their tin to the seaboard, and to bring up their supplies of provisions. The river Kampar, one of its tributaries, traverses a large extent of chocolate-coloured soil in the Kampar district.

The Pêrak river is the great artery of the country. Taking its source in Patani, it follows a main course, north and south, nearly parallel with the sea-coast as far south as Durian Sabatang, whence it takes a westerly direction till it reaches the sea. Bandar Bahru will be remembered as the Residency of the late Mr. J. W. Birch, British Resident at Pêrak, who was treacherously murdered by Malays at Passir Salah on 2nd November, 1875.

It was deemed advisable to move the headquarters to Kwala Kangsa, and I made a survey of the Pêrak river, by chaining along the banks from Kwala Kangsa to Durian Sabatang, and, comprising the ranges on either side of the Kinta valley, an area 45 miles in length by 25 miles in width was added to the map.

After fixing the disputed trans-Krian boundary between the British colony of Province Wellesley and the State of Pêrak, I was appointed in May 1877 to determine the boundaries that separate Pêrak from the countries of Kêdah and Patani, the two latter being tributary to the Siamese Government.

Leaving Penang in a coasting steamer, the capital of the Sultan of Kêdah was reached in eight hours; and that ruler, wisely recognising the utility of having his frontier correctly defined, appointed some of the principal rajahs to accompany me to point out his boundaries, and was good enough to lend me seven elephants for transport of myself and baggage during the expedition. The party, with my own survey staff, numbered forty-two in all.

Commencing the survey from the frontier pillar, marked "British and Siamese Territory," on the river Mudah, I ascended this shallow river in flat-bottomed boats, fixing the positions of villages right and left. The banks of the river displayed a poor deposit of sandy alluvium, 8 to 10 inches in thickness on the surface, lying in places on a stratum of red or yellow clay, the whole resting on a substratum of white marl, all newly decomposed granite. At a point below the Kwala Sedin—a junction with the river Sedin, there are some limestone boulders called by the Malays "Batu Beralah," or the idol rocks, and higher up the river near Campong Teban the limestone again crops up.

Leaving the main river, we ascended the Sungei Kiti, a narrow, tortuous stream much obstructed by fallen timber; the soil on either bank began to improve in depth and quality, the clays lying on a substratum of gravel and large pebbles, and rich padi-fields showing an improvement in this respect.

The Chinese carry on a timber trade with the British settlements,

the woods called "chungah" and "seraya" being cut up into planks and lengths and exported to Penang.

At Kwala Kupang I left the boats behind, and the elephants and party met me, having travelled overland through Kēdah. This is the halting-place for cattle that are driven from Siamese territory, Rāhang, and Kēlantān. The paddocks about Kwala Kupang contain rich grasses, which revive the tired cattle that have travelled for many days and weeks through marsh and jungle, on their way to be sold in Province Wellesley and Penang. The fineness and closeness of the grasses may be attributable to the soil being impregnated with lime. The cattle are purchased in Rāhang for five to eight dollars a head, and realise twenty-five to thirty dollars a head in Penang. The greater number are again exported, to feed the Dutch troops in the Acheen war—a guerilla warfare that has dragged its slow length along for upwards of nine years, and which has not yet terminated.

In this country and in Kēdah tame elephants were cheap; they were offered to me for sale at prices varying from 150 dollars to 200 dollars a head.

The Malays here spend their time cultivating their rice-fields and tending their herds of buffaloes and short-horn cattle. In 1877, 500 of the young men abandoned their homes and fled to British territory to escape the military conscription that enforced the Malays to enter the Siamese army for the fighting in Tongkah. Similar causes, and the petty oppressions of rajahs, have tended materially to swell the labouring population of the neighbouring British possessions, where the Malay rayat (peasant) knows that he is protected by the law.

At Kwala Kupang I measured a base line of four miles, so as to fix as accurately as possible the position and height of Goonong Inas and the lofty peaks of the Titi Wangsa range, which separates the state of Kēdah from Pērak territory. In the Malayan Peninsula, as in other parts of the world, the division of the watersheds is usually a boundary.

Following up the valley of the river Baling, a remarkable hill, called Goonong Wang, rises into prominence, and from the numerous fissures and caverns it is at once recognised to be limestone. The bare white walls rise perpendicularly out of the plain to a height of many hundred feet, above which are overhanging craggy ledges and stalactites. Shells and fossils are to be found in the rock, proving that at a former period the sea washed against its base. On the eastern side of this hill lies the village called Baling, the nearest station to the frontier of Patani. Here were men of different nationalities—from Kēdah, Patani, Siam, and China—busily trading in rice, tin ingots, gutta, cattle, and poultry.

Baling is shaded the greater part of the afternoon by the steep walls of Goonong Wang. Around this hill there are fertile padi-fields, the

soil being of a rich chocolate colour, which usually appertains to the detrital disintegration of limestone formations.

From Baling I returned to Kwala Kupang, and started for Salamah, so as to fix by cross-bearings the principal points of the Titi Wangsa range. Many small streams and rugged spurs of the western watershed were crossed in this course of 48 miles—nearly all through jungle, no places of any importance; and the geological features of undulating country up to 500 feet in height, previously described, again appeared.

There was one formation that arrested my attention, as I had come across it in the gold-fields of Northern Australia, and it is common in Pérak and Sélángor. After crossing the river Sungei Sedin, a gap in the spur that divided the watersheds of the rivers Mudah and Krian was crossed. On the north side of the spur there are large boulders of granite; whilst on the south side, and a quarter of a mile lower down from the gap, there are regular layers of slate, with quartz veins and micaceous schist, cropping up across the track and running in a W.S.W. and N.N.E. direction.

The appearance of the granite on one side, and slate with intersecting quartz veins on the other side of the spur, would have at once tempted a party of diggers to prospect for gold in Australia; and it is probable that, by sinking a shaft as far as the junction of these strata, a metal of some kind might be uncovered. As tin is the chief product of the Malay Peninsula, and as the geological formations that shed either gold or tin are very similar, there is a likelihood that a tin deposit lies buried in this neighbourhood.

From Sedin our course lay in a S.S.E. direction, crossing numerous spurs and valleys, all in jungle, till the village of Ulu Salamah, in Pérak territory, was reached. This village was founded by Patani men who had fled with their families from the unjust exactions of Siamese rajahs, and who settled and cultivated gardens on the Salamah river. I was well received by the headman, Punghulu Mat Dari, who showed me a letter of authority from the Pérak Government.

At the next village, Kwala Salamah, situated at the junction of the Salamah and Krian rivers, there was a population of a thousand Malays and Chinese, the local magnate being a Malay of much influence, named "Che Karim," who sat alone on the bench to dispense the law. The only tax was the ordinary one collected in most of the native states, namely, a duty of 10 per cent. levied on all produce exported, such as tin, gold, gutta, ebony, ivory, &c. The opium and spirit farms were collected at the mouth of the Krian river.

From Salamah a course was made to cross the high range that separates Province Wellesley from the river Pérak, and we ascended the Bukit Tigapuluh Tiga range. This is a succession of thirty-three spurs, rising in steps till the gap is reached. This was a tiresome day's climbing, as, no sooner than the summit of one spur was reached, a drop of several

hundred feet appeared on the other side till the ascent of the next ridge commenced. On each side of the gap, which was 2300 feet above the sea-level, to the north and to the south, the mountains rose to altitudes varying from 5000 to 6000 feet above sea-level. Large boulders of granite obstructed the path, and on the summits I noticed the mountain bamboos of unusually large dimensions, also wild betel-nut palms and luxuriant ferns.

Descending the eastern watershed, the small village, Batu Birdinding, was reached, in the midst of rice-fields which extended for four miles along a fertile valley, as far as Kota Tampan on the Pérak river.

The contrast between British and Malay rule was exemplified at Batu Birdinding. My elephants during the night broke into a plantation and destroyed some young coco-nut trees. I got some old Malays to value the trees and I paid a fair compensation to the owner. On my arrival at another village, Lunggong, the *punghulu* (chief) told me that he had heard of my having paid compensation for the trees, and turning round to some forty of his followers in the audience chamber he said, "Now, in former times, when a rajah entered our villages his elephants often destroyed our gardens and fruit-trees, and he never paid us for them; but now that the country is governed by white men, you see they do what is fair by us."

In travelling along the eastern side of the Titi Wangsa range, it was strange to find that many of the streams were dried up (June 1877) and the whole country suffering from want of rain. This was quite contrary to our experience of the western side of the range, where, ten days before, the rains had been incessant, and where we had much difficulty in crossing flooded streams.

It would appear that during the south-west monsoon, which was now blowing, the western side of the range arrests the rain-charged clouds before they can reach the eastern watershed. I noticed that the ridges on the western watershed were much more rugged, and that the rocks were more exposed on the surface, than on the eastern side; and this may also be due to the force of the Sumatra squalls beating on the western slopes during the south-west monsoons.

Following a northerly course, the villages were few and unimportant until we arrived at Padang and Kernei, villages in Patani, which pay tribute to Siam. Kernei and the surrounding district is ruled by the Tuan Prang, the brother-in-law of the Rajah of Reman, a district in Patani.

The Tuan Prang, being unwilling to meet me, had left Kernei two days previous to my arrival, on hearing of my approach. I gathered from his people that he and other rajahs who pay tribute to Siam were not sure whether they were right or wrong in receiving me, and so they retired from their villages. Otherwise, in Kédah and Pérak I met with

every civility and assistance in the prosecution of my surveys. The people of Kernei argued that, as they had not received any notice of my visit, they might be blamed for showing me about the country; that they would probably be heavily fined; and that, in non-payment of the fine, their wives and children would be seized as slaves. Here the baneful system of debt-slavery was in full operation, and many sad instances were brought before me. The only advice I could give the people in this distant state was to emigrate to Pérak, Sélångor, or Sungie Ujong—states under the British protectorate—where debt-slavery was not recognised in the law courts.

If, on the other hand, they were not blamed for receiving me, they said that they were afraid lest anything should happen to me; that robbers might attack me, and that they would be held to blame; so that, whether they welcomed me or not, they were in danger of being punished.

This diffidence arises from the oppression of the more powerful rajahs, the fear of annexation of their country by the British or other nation, and the ignorance of the objects which an Englishman may have in visiting their country.

Finding that Siamese now was the language spoken, that my knowledge of Malay was no longer of any use, and that the people were unwilling to meet me, I dismissed the Kèdah chiefs with a letter of thanks to their sultan for his assistance in pointing out his boundaries, built a large bamboo raft, and proceeded to float down the river Sungie Ruih.

The Sungie Ruih is a shallow river, at the head of which is situated a large tin mine, called "Kleian Intan," i.e. the granite mine. Near the Kleian Intan is Tassek, a lake which is the recognised boundary between Patani and Kèdah.

Besides the granite and syenite formations, I noticed in the banks of the Sungie Ruih remarkable stratified deposits of slate. The slate is in large slabs, dipping at an angle of 25° with the horizon; it is not bituminous, as it would not burn on being put into the fire, and it is soft, as the knife made an impression on it. If situated nearer to the coast, these large slabs of slate would be very valuable.

For the benefit of sportsmen, I may mention that there are extensive clearings on the Sungie Ruih, which, in addition to the ordinary big game of elephants, tapir, tiger, and rhinoceros, abound with the large sambur deer and wild peafowl.

Gliding down the Sungie Ruih, taking compass bearings along the reaches, estimating the distances by the current meter—a most valuable instrument for calculating rates in rivers—occasionally landing to take bearings when good sights could be had at the neighbouring ranges, we reached the river Pérak in a few hours.

We floated easily over the rapids of the Sungie Ruih; but having been warned by the Malay boatmen that the rapids of the Pérak river

were more numerous and dangerous, it was considered necessary to build a stronger raft; and this was built at Kwala Kendrong, on the Pêrak river. Constructed of large bamboos lashed with rattans, it was 50 feet long by 5½ feet in width. On the floating bamboos was built a house, covered with a roof made of the leaves of the nipa palm, the whole being quite waterproof, and capable of accommodating with ease two inside passengers, with boxes, surveying instruments, &c. In the front part of the raft two Malays sit with paddles on each side, and the pilot stands with a long pole, with which he pushes against the rocks. Another pilot stands in the stern, and with another long pole wards the raft off the dangers astern. We were altogether ten men on board. Some of the passages in the rapids were from 7 to 12 feet wide only, and we jumped fifty-two rapids in the period of seven days in this fragile kind of raft.

At one rapid, called "Jeram Panjang," it was found necessary to take precautions, as many men have been drowned in the cataract. This place was recognised in 1877 as the boundary between Patani and Pêrak by the few inhabitants of this vast jungle. The boulders in this rapid are a hard sandstone, strongly impregnated with iron. The rocks being high out of water, the action of the air had oxidised the iron and exposed the laterite in honeycombed and laminated sections.

At the entrance of the rapid there is a large boulder, called "Berala Bujok" ("Berala" in Malay means an idol, and "Bujok" to propitiate); and every raft passing this rock is expected to make some offering, and ask its permission to pass. On reaching it, our raft was brought to a standstill, and the pilot made a speech to the rock, asking permission, with prayers to Allah and the prophet, to pass the rapid in safety, as there was a white man who wanted to pass, and if anything happened they would be in great trouble. He then threw on the rock a small parcel of plantains, betel-nuts, and a biscuit (the latter as my offering); and we then dropped down the upper part of the rapid till the intricate part was reached, when everybody got out, and boxes and things were carried over the rocks some 300 yards below the falls. Rattans were then fastened to the raft, to hold her back as she dipped over. As soon as all was ready the passage was entered. This passage was very narrow, with rocks in the way, round which the waters boiled. Unfortunately, immediately after taking its plunge over the cascades the stern rope held from on shore broke, the raft telescoped against a sandstone boulder and floated down stream in pieces, the large bamboos snapping like matches in the rushing waters. We slept out that night under heaven's broad canopy on the bank of the river, and in two days' time another raft was completed, which floated the party in safety to Kwala Kangsa, the capital of Pêrak.

The geology of the lands on either side of the river Pêrak bears a strong similarity to the formations already described in Sêlangor. The flat lands on the banks are a very rich detritus, and as in other

Malay states are sparsely inhabited. The Malays do not cultivate rice in sufficient quantities to meet the demand, the large mining interests of Larut and Lower Pèrak depending upon the supplies of rice imported from Bangkok and Rangoon. The high ranges were totally uncultivated, and were inhabited only by the wild tribes called Orang Semang.

The Orang Semang whom I met in Pèrak, and from whom I compiled a vocabulary of their language, are of the same early aboriginal stock as the Orang Sakei whom I came across in Sèlångor and Pahang. From their personal appearance, habits, and similarity of language, there is no doubt of their belonging to a common race. Near settled districts they are rarely of pure breed, and resemble the Malays in features and in habits, excepting in their food and in their disbelief of Mahomedanism or any other form of religion. The true Orang Semang or Orang Sakei is a Negrito, and reminds one of the Papuans of New Guinea, whom I have seen in Torres Straits. Thick lips, skin nearly black, nose with large nostrils, prominent upper lip, hair short and curly, with a curly top-knot on the top of the head, raiments very scanty, these are the characteristics of the Semang.

The map shows that there is a vast extent—more than half—of the Malayan Peninsula still unexplored, of which we only have the position of the coast-line. Of the internal government, geography, mineral products, and geology of these regions we do not know anything; and as the circles of exploration of other countries are narrowing each year, it may be useful, to those whose taste for geographical research may be for “pleasant fields and pastures new,” to know that, even in this nineteenth century, a country, rich in its resources, and important through its contiguity to our British possessions, is still a closed volume.

The **PRESIDENT**, in introducing Mr. Daly, said the Society would be glad to see before them a traveller from a part of the world which, since he had been President, had not been the subject of discussion at their meetings. The region was one of great interest, with a growing trade, the importance of which was increasing rapidly, and in proportion to its importance was the general state of ignorance with regard to that which constituted the wealth and attractions of the country. Mr. Daly had been in the employment of the Government as a surveyor, and had traversed every part not only of the small British states, but of the surrounding native states.

After the reading of the paper,

The **PRESIDENT** said they were fortunate in having present Sir Andrew Clarke, who was Governor of the Straits Settlements during part of the time Mr. Daly was conducting his explorations, and who had since filled posts of great importance. He was sure that they would listen with very great interest to any observations that he might offer.

Colonel Sir **ANDREW CLARKE, R.E.**, said that the paper to which they had listened had dealt so fully with the subject, that there was little left for him to say. There was one point, however, of especial interest to him, and that was, that he was responsible for nominating to office the author of the paper. The record to which

they had just listened of Mr. Daly's labours for eight years showed that those who advised him (Sir Andrew Clarke) in the appointment of Mr. Daly had acted wisely and well. There was another point, also of interest, connected with Mr. Daly, and also directly connected with the work in which he had been engaged, and that was that after an absence of eight or nine years, exposed as he had been to all the vicissitudes of a climate such as that of the Straits, he came before them that evening showing that he had been able to carry on his labours without in the least impairing his health and strength. He referred especially to the climate, because on it depended much the opening up of the country. There would be no practical benefit in the future if the fact were not recognised that the great neglected Malay Peninsula was a province unequalled in the Tropics for its beneficial influence upon the European constitution. He knew of some families belonging to the Anglo-Saxon and other European races of the fourth, fifth, and sixth generation, who were living and doing well, and some of whom lived to a very great age. He regarded the Malay Peninsula as one of the most promising to which young men with moderate capital could emigrate. There were many young men in this country who constantly failed in their examinations for the various services to which they aspired. Many of them had ample intellect, and most of them had good physical power and great energy, to whom this particular part of our empire opened one of the most successful fields for their energy and enterprise. Great facilities were given for the acquisition of land, and he believed that the Indian Government were co-operating with that of this country in order to give facilities for emigration from Northern India. There was another great advantage in reference to the Malay Peninsula as compared with most of the other settlements. There were great facilities for sending produce to market, especially on the western coast, where nature had provided water-carriage. It was traversed by innumerable streams, many navigable, and many which could be with comparative ease made so. In regard to the exploration of the country, he could well remember in 1873, when he was appointed Governor of the Straits Settlements, going to Savile Row and asking the Curator of the Geographical Society whether he had any maps or any information he could give him in regard to the country to which he was going, and he was sorry to say that, as far as he could ascertain, there was absolutely no such information of the least value in their archives. He hoped that the paper they had heard read that evening would lead to more extended observation and exploration. He would, however, in justice to the Geographical Society, say that when he arrived at the seat of his government and asked if he could get information in regard to places other than the settlements over which he was placed, he found that the office there was equally deficient in such information. It seemed to him strange why for nearly eighty years, indeed since the death of the illustrious Raffles, the Government of India should have neglected that great peninsula; but he hoped from the interest that had been excited in it of late there was a better augury for the future. He would call attention to a few facts in order to justify Englishmen in what they had done and were still doing in prosecuting the further settlement and development of that country. The three little spots of Penang, Malacca, and Singapore, situated at great distances from one another, give a line of some 300 or 400 miles of coast. They were the only spots which were purely British territory. The rest of the country was occupied by Malays and Chinese; and most of the Malays who now occupied the country were both rajahs and ryots who came mostly from Sumatra, and their advent to the Straits was comparatively recent. Though the soil of the peninsula was very rich, there were but five or six Malays to the square mile, and there were about 33,000 square miles, and only one acre in every 300 of the territory was cultivated. In our three little spots, comprising

hardly 1000 square miles, the acres were crowded, and instead of having only four people to a square mile there were some 330. If these were foreigners and aliens there would not be much force in what he said; but in the Malay country itself, occupied by Malays and the Chinese associated with them, there were four Malays to the square mile, whilst under the British flag some 125 Malays to the square mile had taken refuge and sought protection under our laws for their industry; so that there was some justification for our settling in this rich, promising, and fertile land.

Mr. ADAMSON (late Member of the Council of the Straits Settlements) said he certainly did not expect to be called upon to make any observations on the paper, but he was very glad to be able to give his testimony to the great prosperity which was likely to attend the settlement of these provinces—a settlement which was first begun by the distinguished official who had just addressed them. These States were for a great number of years left to themselves, and the consequence was that the country generally was such as to be a trouble to all the surrounding peoples. There were constant riots in the country, and it was necessary for our own preservation at the points of Singapore, Malacca, and Penang, that something should be done. Sir Andrew Clarke initiated a policy which, from the day it was fairly started, had gone on step by step in gradual but sure progress. As a merchant of Singapore, he had great pleasure in bearing his testimony to the successful result of that policy. Slavery had been in a great measure put down, settled government had been given to the people, and there had been, consequently, prosperity. It was hoped and expected that young Englishmen would go out to engage in the cultivation of coffee and other products, and he was sure that the Chinese would flock into these territories, and assist in promoting such cultivation, until the country would become rich and prosperous, and a credit to this country in every way.

The PRESIDENT, in passing a vote of thanks to the author of the paper, said that Mr. Daly had introduced them to a country which was new to most of them. In regard to the products of the country, Mr. Daly had especially referred to the tin mining, which, of all the metal trades, was that which was expanding most rapidly. Our own tin mines in Cornwall had long ceased to supply the portion of tin they used to do, and we had to get it now from distant regions, and he believed some of it had been supplied from the region over which Sir Andrew Clarke was once the governor—that of Tasmania. In regard to the supply of coffee, which one was happy to hear was increasing, but not at such a rate as was hoped, it was well known that the once fertile region of Ceylon was rapidly diminishing in productive power, either from the disease or exhaustion of the plant. Ceylon was not what it once was, and enterprising Englishmen were seeking regions where coffee might be cultivated with advantage, and especially in these Straits Settlements. There was another point of view from which the matter might be regarded. Those who were the fathers of large families knew the difficulty they had in finding employment for their children. A large number of the educated youth of England, as well as of the non-educated, were seeking employment in countries which were inhabited not only by those of the same blood as ourselves, but who were under foreign rule—he meant the United States of America. One was glad to feel that there were fields within the limits of the British Empire which were still opening to them in increasing numbers. Again, many writers upon India had called attention to the fact of the enormous increase of population that had taken place under our peaceful sway. Formerly the increase of population in India had been kept down by incessant wars; but now railways had been opened up, peace had been preserved, and trades of all kinds had sprung up. Probably from want of proper means of distribution the population had increased in such a ratio as to cause considerable alarm as to the future in regard to India. It

seemed, therefore, that such a *débouché* as was offered for the population by the Straits of Penang, where the climate was suitable, was a matter of great importance. There was another matter they had listened to with great satisfaction, and that was the protection offered to native states immediately adjoining the British possessions. The Malays suffered from the arbitrary conduct of the Siamese rajahs, but they found protection from the English through the Malay Peninsula. He was sure that they would join most heartily with Mr. Daly in hoping that the same careful exploration would be made of the eastern portion of the peninsula as had been made of the west. They would agree with him that they had seldom listened to a paper the author of which gave more evident signs of being an accomplished observer, both as a geographer and a geologist. The paper was not one of mere personal interest, but contained facts which would be referred to hereafter by every one who wished to add for the information of his countrymen facts concerning this partially explored country.

*Dr. Albert Regel's Journey in Karateghin and Darwaz.**

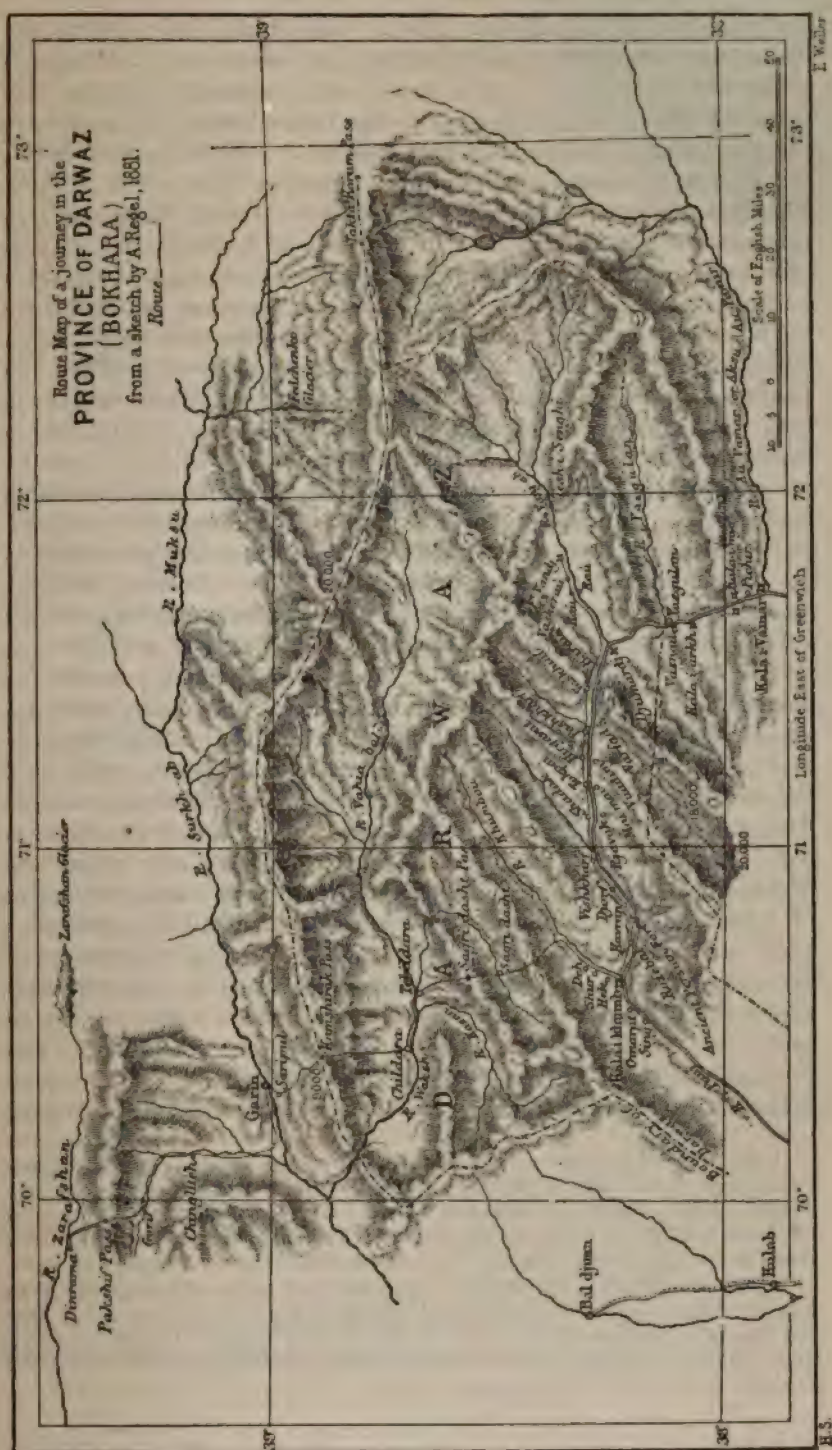
DR. REGEL, to whom we are indebted for the following sketch of a region hitherto left blank on our maps, is the well-known explorer and botanist whose journey to Turfan in 1879-80 was described in the 'Proceedings,' New Monthly Series, vol. iii. p. 340. Our account is nearly a literal translation of his letter published in the last number of the Russian *Izvestiya* which has reached us. Dr. Regel writes as follows:—

"KALA-I-KHUMB, 27th September, 1881.

"In fulfilment of the task confided to me by the Imperial Russian Geographical Society to explore the head-waters of the Amu-daria, I devoted the present year to the investigation of the Bokharian province of Darwaz, and attained the farthest limit to which my credentials enabled me to penetrate. My first care was to ascertain the direction of the mountain chains and rivers. Crossing the Zarafshan range, I descended into Karateghin and passed through a mountainous tract occupied by three meridional outlying ridges. On the other side of the Surkhab I found the mountains running diagonally to the meridian, i. e. from north-east to south-west. The first range occupies all that region between the rivers Surkhab in Karateghin and Waksh in Darwaz; the second lies between the Waksh and Panj, while the third in its continuation divides the lower courses of the Panj and Waksh. East of the lower Panj, and in a similar direction, rise the great mountains north of Badakhshan parallel with the Hindu Kush, and these also fill in the region between the Khumbai and Wanj. The last-named river is bounded on the south by another diagonal range forming part of the hill state of Roshan.

"From the western border of Pamir this region is separated by three valleys which have nearly an opposite direction (i. e. almost due west): the northernmost of these is the Muk-su, one of the head rivers of the Surkhab; the next is the Wahia-bal, probably the principal source of the Waksh; the third is the Takhta-korum, entering the Aù-pamir (Tadjik

* From the *Izvestiya* of the Russian Geographical Society, vol. xviii. No. 2.



for 'Pamir water*'), or Ak-su. Of the rivers I saw, the Surkhab and Waksh have both muddy water, and are nearly equal in size—50 fathoms or 350 feet is about the breadth of the latter. (Strictly speaking, the name Khullias given on the maps to the Upper Waksh only applies to the plantation or farm round Fort Childara.) Till these rivers unite, the Panj in its central course is more imposing than either of them. Near Kala-i-Khumb it is over 480 feet wide, though it contracts in places to 350 feet, and in winter its level falls 28 feet when its stream is obstructed by floating ice, though the rapidity of the current prevents its freezing over. This river, too, is muddy. Its minor tributaries are the Khumbah, the Uzharf, and the Harf. The Wanj is a large, turbid stream, 200 to 350 feet wide. The natives have a fancy for calling the Panj one head of the Oxus and the Wanj the other. Their valleys are very different, for while that of the Wanj is open, the Panj flows through a narrow defile, leaving but little room for Tadjik settlements, and only widens near the mouth of the Wanj, contracting again towards Roshan. The road up the defile is practicable throughout for a pack train which need only be unloaded at one place a few paces long to prevent the wider articles from striking the rocks. Wherever the cliffs are vertical with a sheer descent to the river a roadway has been thrown out supported on poles let horizontally into the face of the rock and covered with branches. During the frequent wars which preceded the annexation of Darwaz by Bokhara these light bridgeways were frequently destroyed. The summer route from the Wanj valley to the pass of Yazgulan on the way to Roshan is quite practicable; not so that followed in winter along the Panj, which offers difficulties; beyond Yazgulan the road improves. Besides the Kala-i-Khumb road there is only a footpath leading from the sources of the Waksh across the Wahia-bal to the Wanj valley, and thence to the head-waters of the river of Roshan. The high road to Pamir crosses Roshan, all the other paths lie for a considerable distance over ice-fields. The Panj is unbridged in Darwaz and Shugnan,† and can only be crossed on inflated skins (*gupsars*), and in a few places only during winter in boats of a square build; but in Badakhshan there is a good ferry near Kalab. The Surkhab, Waksh, and Wanj are bridged. The climate of Darwaz is better than that of Karateghin; the summer is dry and warm. During

* The translator invites attention to this word *an* as an interesting etymological proof of our common ancestry with the Tadjiks. The same word constantly occurs in Western Europe in the names of rivers; thus we have the *Aa* in Livonia, an affluent of the Western Dvina, and in Iceland it is a common affix to the names of rivers, thus *Thiorsa*, pronounced *Thiorsaù* (Thor's water), *Hvita* (white water), &c.

† Lieutenant Wood, in his narrative of a journey to the source of the Oxus (p. 262), says the river is bridged in Darwaz, and between it and Shugnan one or two rude descriptions of boats are in use. Are we then to infer that the bridges have been destroyed since his time or was he misinformed, his personal observation not having extended so far north?—TRANSLATOR.

the winter, which lasts a few months, snow interferes with the communications between the settlements, whereas in Karateghin the cold season is of longer duration.

"With reference to minerals, the Wanj iron is celebrated. It is obtained by smelting the ore with charcoal in pits. 'If Allah help, the metal is good, if not it is bad.'

"The limestones and sandstones north of the Waksh are fossiliferous; in the Panj valley, on the other hand, the older schists and igneous rocks are the most conspicuous formations. The arborescent vegetation of Karateghin is abundantly represented on the Waksh by the maple, ash, and hawthorn, the *celtis*, pistachio, and Turkistan juniper. Only the higher tracts about Sagri-desht have an Alpine flora and afford pasturage for the wild goat which in winter seeks the warmer valleys. Near Fort Kala-i-Khumb the sombre, naked cliffs afford a greater variety of vegetation; here may be seen the wild vine and the *cissus*, the pomegranate and the *Ceratonia siliqua*; and near the Tadjik villages the plane, the mulberry, and other fruit-bearing trees. In the gardens in the Panj valley many of our familiar flowers are cultivated, besides sunflowers, never seen in Sart villages. Even on the Waksh one may see such vegetables as beetroot, kohlrabi,* and others used for making thin and thick soups, which are the staple food of the Tadjiks.

"The inhabitants of the Upper Oxus regions, even in Karateghin, show a mixture of race. But the Tadjiks of Darwaz are of pure Aryan type; their hair, sometimes dark, at others fair, is rarely shorn, and they wear a short dress. The women go about unveiled and marry by consent; their cast of features is curiously enough both European and gipsy-like. The Tadjik language differs but slightly from that spoken at Bokhara and Samarkand where the Persian has had such a marked influence. The dialect of Shugnan, on the other hand, is distinct, and many of its sounds have a resemblance to one or other of the languages of Europe. The national melodies are like those of Europe. Their building materials are stone and mortar; and in the Panj valley, above the flat two-storied roof thatched with straw or branches there rises not unfrequently a square tower or a whitewashed verandah. The walls of the interior have the appearance of having been polished, an effect produced by smearing them with small stones and clay; the upper parts are whitewashed. Round the rooms are benches of the same material to rest on, and one corner is occupied by a raised edifice like a Russian stove, on the summit of which on three sides are ledges behind which are concealed the stools with semicircular holes for holding the cooking-kettle. Every house has its staircase, a well, a circular walled enclosure for collecting irrigating water, wooden and clay vessels, guns, and bows with a double string for hurling stones.

* A kind of cabbage.

"Darwaz was formerly independent under its shahs or kings. Forty years ago, however, a war which had lasted twenty years ended in the capture of Wanj, and the sale of many of its inhabitants at Bokhara. Karateghin too suffered from wars. In 1868 a campaign was undertaken against Shugnan, ending in the defeat of the Darwaz people and the sale of their defenders in Badakhshan and Kashgar. Upon the re-establishment of Bokharian supremacy in Karateghin, Kala-i-Khumb was occupied in 1878, and though the native prince managed to collect a fresh army, he was completely defeated at Kibrani. Kala-i-Khumb is at present only a military station, all trade having disappeared in Darwaz, the only articles of commerce left being small stones for grinding and for seals.

"The province of Darwaz now extends from the valley of the Waksh to that of the Wanj, and includes both banks of the Panj from Yazgulan to Koft ferry.

"Childara, Tevildara, Tagbar, and Wanj are fortified with high ramparts and towers erected during the last century.

"Kala-i-Khumb is said to have been founded by King Solomon or Alexander the Great. There are ruins on a rock five miles off. Here, the tradition runs, lived a rebellious vassal of the King of Bagdad, the sorcerer Kakai. At Alexander's bidding he helped him to seize Bagdad, then exercised his spells over him and led him to Kala-i-Khumb. Many years afterwards Iskander's daughter, Diova Peri, transformed into a bird, learned the whereabouts of her father, broke in sunder his chains, and persuaded the magician to remove his spells, upon which she threw a robe over him and suffocated him. Iskander conquered the whole of Iran and converted its inhabitants to Mahommedanism. A. REGEL."

A month later, 29th October, 1881, Dr. Albert Regel writes from Surkhan, south-east of Shirabad, in Bokharian territory, to E. L. Regel: "I am seated in an Uzbek yurt on my camp bed, the ground is covered with felt carpeting. My Sart portmanteau serves me as a table; on it at this moment are placed tea, melons, preserved pistachios and almonds, with a few crusts of bread baked especially for me without sesamum oil.

"My dinner always consists of pilaw or rice mixed with meat and onion, and cooked with sheep's-fat, then a roasted fowl, or occasionally a quail or grey partridge; for my dessert a second edition of boiled rice. All this is served with the greatest goodwill, though it must be confessed their style of cooking does not suit the European palate. Unfortunately one may not enjoy the excellent fruit grown here without risking a stomach disorder and fever.

"All my surroundings are thoroughly Eastern; in the distance I can see the ruins of a minaret which dates from the time of Timour, whilst my camp is pitched in the midst of reeds, bushes of mimosa, and erianthus; jackals howl at night and pheasants call in the morning.

"My host is Manam Basha, chief adjutant of the Amoor of Bokhara. During my journey from the Zarafshan to Karateghin and Darwaz I drew a small map of the country and made a collection of minerals,* seeds, and a rich herbarium.

"Among others I have seeds of some of the mimosas, *Astragalus*, *Incarvillea Olgae*, *Lathyrus*, remarkable for its unusually large flowers, *Lonicera turkestanica*, besides species of *Amygdalus*, *Celtis*, *Celastrus*, *Cissus*, &c.

"Among bulbs I secured some entirely new species, particularly of the tulip and colchicum; besides different kinds of wood and fibrous tissue used in the looms, for the Museum of the Botanical Gardens; and for the Geographical Society a collection of rocks which I shall bring with me in autumn.

"In spring I think of making a journey to the south of Hiassar and exploring some ranges of mountains entirely unknown."

On the 19th November Dr. Regel writes from Khuzar, south of Samarkand, to say that he had been unexpectedly detained owing to the necessity for a formal interchange of presents, which had obliged him to send a man to Samarkand to buy a gift for his Bokharian guide. He had further added to his collection reptiles, a new antelope, an argali, a jackal, a hyæna, a corsac (steppe wolf), several specimens of the feline tribe, and a most interesting collection of archæological remains, such as stone implements, Greek coins, &c.

[The map we here give is a reproduction, translated, of that sent to St. Petersburg by Dr. Regel.]

Captain P. de Andrada's Journeys to Maxinga and the Mazoe, 1881.

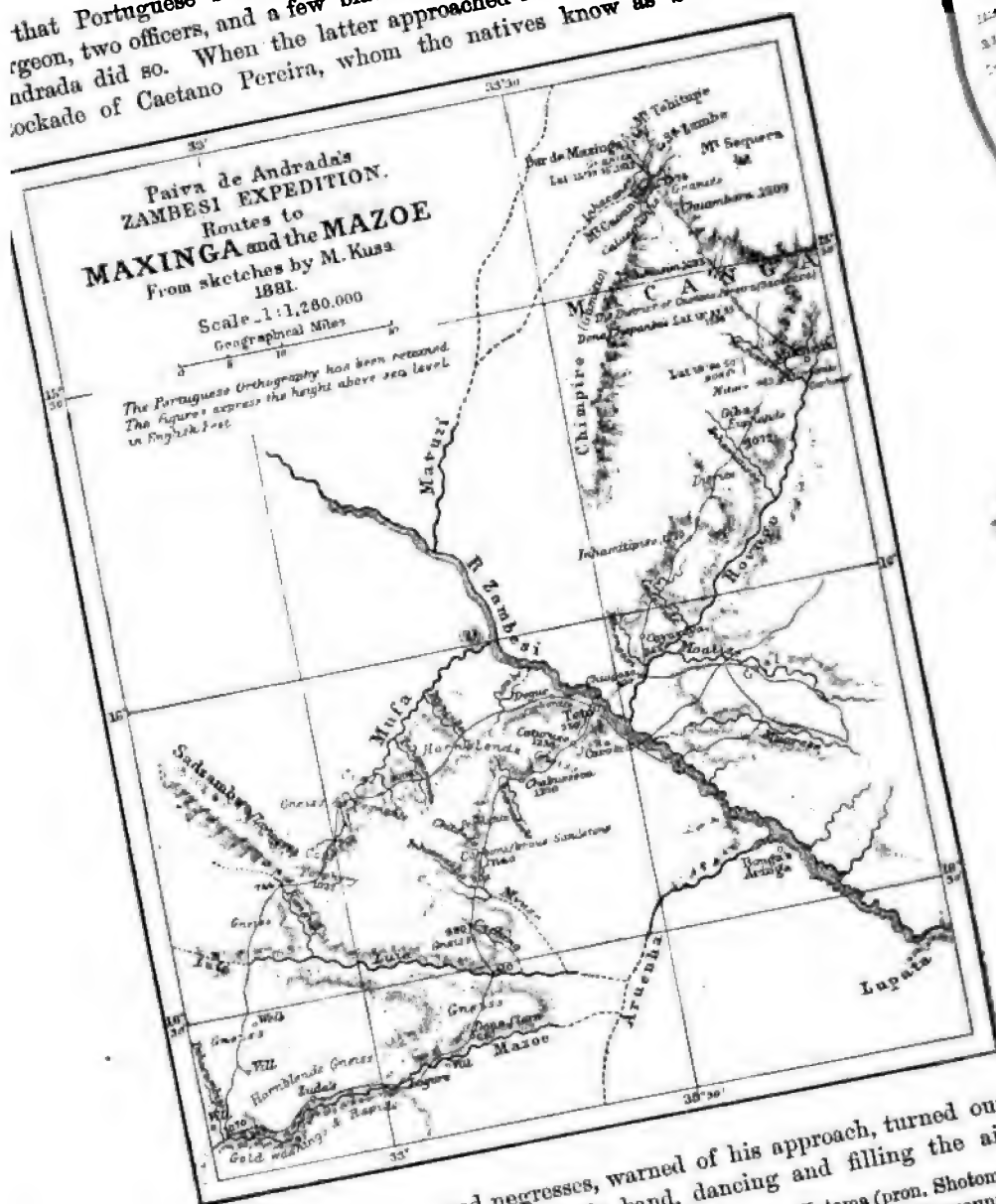
IN the last number of the 'Proceedings' we published a map illustrating Captain de Andrada's journey to the gold-mines of Manica, in the course of which he settled authoritatively the system of drainage to the south of the Zambesi, and proved that some of the old Portuguese maps came nearer the truth than most modern maps published since the days of D'Anville. To-day we place before our readers some details regarding Captain de Andrada's journeys to Maxinga and the Mazoe. Less interesting, perhaps, than the former expedition, the results achieved were nevertheless of considerable importance, and the map prepared by M. Kuss, with its latitudes and altitudes, and more especially its geological notes, is a valuable contribution to African topography.

The gold-fields of Maxinga are well known to the readers of Dr. Lacerda and Gamitto. They had been abandoned some time before Captain de Andrada's recent visit, though the country around is occasionally visited from Tete. It thus happened that the Governor

* The minerals have arrived in St. Petersburg and are in the hands of Professors Mushkétov and Romanofsky for classification.

CAPTAIN P. DE ANDRADA'S JOURNEYS

that Portuguese settlement had started for the mines, with a surgeon, two officers, and a few black soldiers, a day before Captain de Andrada did so. When the latter approached Muchena, the aringa or lockade of Caetano Pereira, whom the natives know as Sacasaca,*



hundreds of negroes and negresses, warned of his approach, turned out to meet him, headed by Pereira's band, dancing and filling the air

* This Pereira or Sacasaca is the grandson of the Pereira or Xotama (pron. Shotoma) of Dr. Lacerda's time. His father was known as Chisacca. The name of the country where Pereira is Macanga, not to be confounded with the tribe of the Waganj.

with their shouts and the firing of guns. Having rested a few days at Muchena the whole party started for Maxinga. About half-way it entered a deserted tract which is occasionally traversed by marauding Maviti from the north-east. When this happens fights take place between the outlying villages of Macanga and the never-welcome visitors. The villagers are well able to hold their own, still the name of "Landin," "Landeem," or "Maviti" is held in much dread, and in getting into the wilderness one of the governor's black interpreters, a man from Tete, talked of nothing but the night attack which was sure to be made upon the camp. The fears which filled his soul found a sympathetic response among a few porters and even soldiers, and these decamped during the night. When they arrived at Tete they reported that the exploring party had been attacked and scattered. This false rumour soon spread to Quillimane and even found its way into European papers. In reality, however, no Maviti were seen, and so little apprehensive were the explorers of being attacked by them that the Governor of Tete did not hesitate to leave Captain Andrada and his small party alone at Maxinga, so that they might more fully explore its vicinity. During its stay at Maxinga the party drew their supplies from Muchena, strings of women arriving daily with the flour and sheep which Sacasaca had undertaken to furnish.

Captain de Andrada's second trip extended about 60 miles to the south-west of Tete, as far as to the gold-washings of the Mazoe. The intervening country is for the most part covered with thorn-scrub, and travelling is arduous. Gneiss is the prevailing rock, and there are considerable patches of carboniferous sandstone, but coal was found only along the Mufa. The Mazoe, where first reached, is a wide river, with a sandy bed, but higher up it takes its course through a narrow gorge, and forms numerous rapids. It has water throughout the year, whilst the Luia and Mufa dry up or shrink into pools. The Mufa, however, as is proved by the flood-marks on its banks, is a most powerful torrent during the rainy season, at which time it might no doubt be utilised for floating down the timber which abounds on its steep banks.

Whilst Captain de Andrada was absent on these two expeditions, M. Lapierre, a mining engineer attached to his party, examined the carboniferous region to the east of Tete. M. Guyot, the chemist, who stayed most of the time at Tete, engaged in chemical analyses of the minerals forwarded to him, accompanied M. Lapierre for a few days. The difficulty with the natives, which M. Guyot refers to,* is not alluded to in M. Lapierre's official report, and it is not likely that Bonga was mixed up in it. Bonga, indeed, was most friendly in his relations with the members of the expedition. When he heard it was coal they searched for, he forwarded a few samples to Tete, and subsequently provided Captain de Andrada with porters to attend him to the Muarezo, where these samples had been obtained.

* See 'Proceedings,' 1882, p. 374.

GEOGRAPHICAL NOTES.

New African Expedition.—The Council have decided on equipping an expedition to Eastern Africa for the exploration of the snow-capped mountains, Kenia and Kilimanjaro, and the country between them and the eastern shores of Victoria Nyanza. Mr. Joseph Thomson is to be the commander, and according to present arrangements he will leave England for Zanzibar to organise his party early in the ensuing year.

Lake Nyassa.—We learn from the Secretary of the Free Church Livingstonia Mission that Mr. James Stewart, C.E., has started in the mission sailing-boat *Herga* for the eastern side of Lake Nyassa to map out the coast-line, a work required to complete our knowledge of the outline of this wonderful mountain-girt fresh-water sea. The lake was reported early in March to be rising.

The Eira Search and Relief Expedition.—The *Hope*, chartered by the Committee who have had in charge the organisation of the expedition for the search and relief of Mr. Leigh Smith and the crew of the *Eira*, sailed from Gravesend on the 22nd of June. The vessel, as announced in our June number, is commanded by Sir Allen Young, C.B., and he has under him four officers and thirty-two men. The list of officers and crew is as follows:—*Officers*—Lieut. Herbert Swire, R.N.; Lieut. John Casement, R.N.; Lieut. P. Bairsfather, R.N.; and Surgeon John Price. *Crew*—William Lofley, ice master; John Crowther, mate; George R. Byers, second mate; Thomas Fenton, first harpooner; Charles Marshall, harpooner; Andrew Valentine, harpooner; John Harvey, boatswain; William Masson, cook; John Johnstone, carpenter; William Robertson, first engineer; George Pert, second engineer; James Thompson, fireman and blacksmith; William Laing, fireman; Robert Crooks, boat-steerer; John Gill, steward; James M'Millan, boat-steerer; Adam Gray, boat-steerer; George Alexander, line manager; David Milne, line manager; John Allan, able seaman; David Walker, able seaman; Alexander Robertson, able seaman; Thomas Clark, able seaman.

We subjoin the instructions drawn up by the Committee and approved by the representatives of the Admiralty for the guidance of Sir Allen Young:—

“The object of the despatch of the screw steam whaler *Hope* under your command to the Arctic regions during the navigable season of 1882 is to convey succour and relief to Mr. Benjamin Leigh Smith, the officers and crew of the exploring vessel *Eira*, so far as the means at your disposal will enable you to do. All the facts that are known or reasonably conjectured relating to Mr. Leigh Smith's expedition, the quantity and nature of provisions, coals, and stores that were on board the *Eira* when she left Peterhead, the weight and dimensions of her boats, number of the crew, size and draft of the *Eira*, and the objects of the voyage so far as they are known, are in your possession, as well as all existing information respecting the navigation of the Barents Sea and of the coast of Novaya Zemlya

and Franz-Josef Land. Judging from what was known of Mr. Leigh Smith's intentions and from reports received from Norway, the *Eira* may have succeeded in reaching the coast of Franz-Josef Land, and have wintered either in the neighbourhood of Eira Harbour or further to the westward. But, on the other hand, she may have wintered in the drifting ice. In this uncertainty the course to be adopted in using your best endeavours to effect the object of the voyage must be left mainly to your own judgment after you have had the opportunity of examining the state of the ice in the Barents Sea and obtaining such local information as may be useful for your future guidance.

"It is desirable that in the event of the crew of the *Eira* retreating to the coast of Novaya Zemlya a depôt of provisions should be established under the care of the Russian officer at Karmahule or Mûder Bay, also one in the neighbourhood of Admiralty Peninsula, and that cairns, with records stating the positions of the depôts, should be placed on Sukoi Noss, $73^{\circ} 44'$ N., and Admiralty Peninsula 75° N. (or further north, according to your judgment), being points which are likely to be visited by retreating parties.

"Requests have been made to the Russian and Norwegian Governments to warn the crews of vessels of those nations visiting the coasts of Novaya Zemlya to keep careful look-out, and not to touch any depôt they may find.

"After having visited the coast of Novaya Zemlya, you should cruise along the edge of the ice in search of boats, and in the event of your finding clear and navigable water, but not otherwise, it may be possible to extend your search further north in the direction of Franz-Josef Land, taking every precaution not to get your ship beset in the ice. When a vessel is once beset she is powerless to act in rendering assistance to others.

"The exact course to be pursued will depend upon local circumstances, and must, therefore, be left to your discretion and judgment.

"It is particularly desired that you should return in the end of the navigable season, and that every effort should be made and every precaution taken by you to avoid being detained for a winter.

"Should Eira Harbour or any point on Franz-Josef Land be reached, a depôt with information of the positions of other depôts should be left there, and, unless under very exceptional circumstances, such as positive information in regard to the position of the missing vessel or her crew, no attempt should be made to push the search beyond such point.

"You will be unable to make the search complete without also visiting the coasts of Spitzbergen, but it has been ascertained that Captain Palander with the Swedish Observing Expedition will be at Mossel Bay, and that officer, as well as the walrus hunters, will be requested to keep a look-out for and assist retreating parties.

"The relief vessel should remain on the coast of Novaya Zemlya, to the southward of the edge of the ice, so long as there is a possibility of the missing crew coming out in boats. The Austrians, it will be remembered, reached the land in their boats as the last vessel was leaving.

"You should leave behind you a brief statement of the probable course you will pursue to secure the safe retreat of your own party, should you unfortunately be detained in the ice after the navigable season of this year has closed.

"In conclusion, it is only needful, looking to the impossibility of giving more detailed instructions, to assure you that the fullest reliance is placed in your knowledge and judgment, and that the utmost confidence is felt that, whether you succeed or fail, your best efforts will have been made to carry out the objects of the voyage with the means that can be placed at your disposal. Full particulars of your own proceedings should be left in records placed in conspicuous cairns at the points already mentioned.

"The Committee met at the Royal Geographical Society's Rooms on May 17th, 24th, and June 10th, 1882, and after careful consideration the above instructions were approved of.

"G. S. NARES.

"A. YOUNG.

"T. V. SMITH."

"At the request of Mr. T. V. Smith, we have read and considered the above instructions, and are of opinion that they meet, as far as possible, the object in view—viz. the attempted relief of Mr. Leigh Smith and the crew of the missing vessel *Eira*, and we concur in them accordingly.

June 18th, 1882.

"GEORGE HENRY RICHARDS, Vice-Admiral.

"L. A. BEAUMONT, Commander, R.N."

The expedition having thus set sail under the happiest auspices, amply equipped for the objects it has in view and amid the plaudits and good wishes of the nation, Mr. T. V. Smith has reported his proceedings in the following letter to the Admiralty:—

"MY LORDS,

"111, GROSVENOR ROAD, S.W., June 22nd, 1882.

"Referring to your Lordship's letter of March 29th, 1882, enclosing letter from the Secretary to the Treasury of March 23rd, 1882, and your Lordship's letter of May 22nd, relating to the Grant in aid to the "*Eira* Search and Relief Expedition," I have the honour to express my thanks for the confidence which you have reposed in me and my advisers in leaving to our discretion the arrangements connected with the Expedition. I have likewise to thank your Lordships for the assistance which you have caused to be rendered to me in the matter.

"I have, at my own expense, chartered and fitted out, to the satisfaction of the commander and his brother officers, the steam whaler *Hope*, which sailed yesterday, under the command of Sir Allen Young, C.B., and I have now the honour to enclose copy of the Instructions drawn up by the Committee appointed for this purpose, and concurred in by Vice-Admiral Sir George H. Richards, K.C.B., and Commander Beaumont, R.N., as required by your Lordship's letter of May 22nd, for the guidance of Sir Allen Young.

"With regard to the letter from the Secretary of the Treasury of March 3rd, in which it is stated that 'My Lords are prepared to submit an estimate of 5000*l.* to Parliament for the purposes of the Expedition, and on proof of the collection of at least equal sums from private sources,' I have to inform your Lordships that the cost and liability already incurred by me has considerably exceeded 10,000*l.*, and beyond this there are other liabilities which cannot at present be estimated.

"I beg, therefore, to request that your Lordships will now take such steps as may be deemed necessary to obtain the Grant referred to.

"I have the honour to be, my Lords,

"Your most obedient servant,

"T. V. SMITH.

"The Lords Commissioners of the Admiralty."

The Jeannette Expedition.—A further telegram has been received by way of Irkutsk at the London office of the *New York Herald*; sent by Mr. W. H. Gilder, a special correspondent of the *Herald*, who sailed in the *Rodgers* search expedition and made his way across North-Eastern Siberia after the burning of the *Rodgers* on New Year's day. The telegram is worded as follows:—

"LENA DELTA, April 12 (24), 1882.

"Melville found bodies De Long's party, March 23rd; they were in two places, 500 and 1000 yards from wreck of scow. First started from supply depôt to follow Ninderman's route from Usterday to Matvey, afterward from Matvey back toward Usterday, looking for wreck. Found wreck, and following along bank, came upon rifle barrel hung upon four sticks supporting bridge poles of snow bank; set natives digging each side of poles, who soon came upon two bodies under eight feet snow. While natives digging towards east, Melville went on bank 20 feet above river to find place to take bearings; saw camp-kettle and remains of fire about thousand yards from tent place, and approaching, nearly stumbled upon De Long's hand sticking out of snow about 30 feet from edge of bank. Here, under about foot of snow, found bodies De Long and Ambler about three feet apart, and Ah Lorn lying at their feet, all partially covered by piece of tent and few pieces of blanket; all others, except Alexy, found at tent place. Lee and Knack close by. In cleft in bank towards west two boxes records, with medicine chest and flag on staff at tent place; none of dead had boots, feet covered with rags tied on. In pockets of all were pieces of burnt skin clothing they had been eating; hands of all more or less burnt and looked as if when dying had crawled into fire. Boyd lying over fire and clothing burnt through to skin, which was not burnt. Collins's face covered with cloth. All bodies carried to top of hill 300 feet high, about 40 versts south-west from where found, and interred in mausoleum constructed of wood from scow, built form of pyramid, 22 feet long, 7 high, surmounted by cross 22 feet high, and foot square, hewn out of drift wood, conspicuous at distance of 20 versts. Mausoleum covered with stones, and to be sodded in spring, cross inscribed with record and names of dead, cut in by search party in their house at night. After completing tomb, party separated to search delta for traces of Chipps' people; Melville north-west part of delta, and west as far as Olenek river, Ninderman centre, and Bartlett north-east. Ninderman and Bartlett found nothing; Melville not yet returned; search to be extended to Cape Borkhoya and bay. Expect to finish in time to reach Yakutsk or Verkhoyansk before rivers break up; if not, will have to retreat to foot of hills and mountains with natives until water falls, as whole delta covered with water in spring four feet deep, though now bank some places 20 feet above level of river; otherwise, would have buried dead where found. Letters with map and diagrams by mail."

Austrian Polar Meteorological Expedition.—The Austrian war-steamer *Pola* * has returned to Tromsø from Jan Mayen Island, having been unable to land the expedition on account of the ice. She is to make another attempt after fourteen days' stay at Tromsø, by which time it is hoped the ice may have cleared away sufficiently for her to reach the island. Count Wilczek is himself on board the *Pola*, which is

* See *ante*, p. 292.

a vessel of 900 tons burden and 90 horse-power, with a complement of 16 officers and 70 men.

The Danish Geographical Exhibition.—An International Geographical Exhibition, similar to that which was held last year in Venice, is at present open in Copenhagen, and promoted by the Danish Geographical Society. Among the objects of interest exhibited may be mentioned a copy of a papyrus map, of the year 1400 B.C., of the gold-fields of Ethiopia, and one of 1200 B.C. of a royal tomb at Thebes, both said to be the oldest maps extant. There is also in the exhibition a splendid collection of maps and plans belonging to the period from A.D. 1400 to 1600, drawn by the most distinguished geographers of the period, such as Bianco, Mauro, Martin Behaim, la Cosa, Leonardo da Vinci, and others. These are contributed by Italy, Germany, France, Holland, Austria, and Switzerland; England, however, is we understand, as usual, poorly represented. Of Danish exhibits of interest, we may mention a terrestrial globe of pure silver from the castle of Rosenborg, and made in the reign of Fredrik III. (1648–70).

Swedish Geological Expedition to Spitzbergen.—The Swedish geologists Alfred Nathorst and Baron de Geer will leave Tromsø on the 1st of June to make a thorough geological examination of Björnø and the southern part of Spitzbergen. Zoological and botanical observations will also be made. The expenses of the expedition will be borne by the Swedish Government, aided by private subscription, and Professor O. Morell, chief of the Geological Department, and Baron Nordenskiöld, have actively interested themselves in the undertaking. The *Bjogna*, a vessel of 35 tons, with a crew of eight men, has been hired for a period of four months for the use of the expedition, and a number of pigeons will be taken to carry back despatches to Tromsø.

Obituary.

Mr. Thomas Woodbine Hinchliff.—By the death of Mr. Hinchliff, which took place suddenly at Aix-les-Bains, in Savoy, on May 8th last, in his 56th year, the Society loses a member who, if not an explorer, was himself an indefatigable traveller, and by his writings has done much to spread that intelligent love of nature, which is one of the chief incentives to travel in our countrymen.

Mr. Hinchliff first came before the public in 1857 as the author of a volume entitled 'Summer Months among the Alps.' This book, together with Mr. Alfred Wills's 'Wandering in the High Alps,' sowed the seed of the passion for mountain exploration which has since spread over Europe. If its principal result has been to create a healthful and harmless amusement, geographers may also remember that Alpine travellers have largely contributed to the accurate resurvey of large sections of the mountainous districts of our continent, and the removal from our maps of many inaccuracies and several legendary summits, such as Mont Iséran; and that the Alps have served as a training-ground for many travellers afterwards distinguished in wider fields, as for example, Mr. Edward Whymper, Mr. John Ball, Dr. Güssfeldt, and Lieutenant Payer. The firstfruits of the mountaineering spirit was

the formation in London of an *Alpine Club*. Mr. Hinchliff was one of the original members, the first Honorary Secretary, and subsequently for three years (1878-80) the President of this body.

From hard work in the mountains Mr. Hinchliff was however debarred during the latter years of his life by an unfortunate accident which shattered his right hand. He turned to more extended travel, paying several visits to South America, and on one occasion going round the world. The results of his journeys were given to the public in two volumes, 'South American Sketches' (1863), and 'Over the Sea and Far Away' (1876). No traveller has described the beauties of vegetation and the picturesque scenery of South Brazil more vividly and aptly than Mr. Hinchliff in the chapters devoted to that country in his 'Sketches.' In the later volume the mountain landscapes of California are brought before the reader's eyes with singular charm. Both of these works display Mr. Hinchliff's characteristic qualities as a writer. His style was always simple, quiet, and lively. He never strained after effect, or attempted to be forcibly humorous. He had a true enthusiasm for nature which breaks out as heartily over the meanest flower—he was a fair botanist—as over the most stupendous mountain landscape. He always wrote pure English—no small praise in these days—and his books may be re-read at any moment by men of educated tastes with pleasure and profit. In 1872 Mr. Hinchliff, in conjunction with Mr. Bates, conducted the Society's Public School Examination, taking the Department of Political Geography, the special subject for that year being South America.

Mr. Hinchliff died unmarried. He was called to the bar, but never practised. On the qualities of private life this is not the place to enlarge; but no notice would be adequate which did not repeat what one of his early companions has written—"Hinchliff had a genius for friendship." With any personal ambition his abilities might have won him a widely known name. But in pursuit of success of the ordinary kind he would never make the slightest exertion. It was only when acts of kindness to others were to be done that he roused himself to action; then he was indefatigable. He has the reward he most cared for, in leaving behind him a memory which will be affectionately kept alive until the last of his wide circle of friends has followed him.

THE ANNIVERSARY MEETING, MAY 22ND, 1882.

The Right Hon. LORD ABERDARE, President, in the Chair.

ELECTIONS.—*M. Gottlieb Bauer, Esq.; Isaac Brook, Esq.; Edward Cazalet, Esq.; The Earl of Dalhousie; T. E. Grice, Esq.; Captain Frederick Loder Symonds (Bomb. Staff Corps); Henry Gyles Turner, Esq.; Henry W. Williams, Esq.*

The proceedings commenced by the SECRETARY, Mr. C. R. Markham, reading the rules relating to Anniversary Meetings, and the minutes of the last Meeting, held May 23rd, 1881.

The PRESIDENT appointed Mr. S. W. Silver and Captain G. Peacock as scrutineers of the ballot for the new Council.

Mr. MARKHAM then read the Annual Report of the Council, as follows:—

REPORT OF THE COUNCIL.

The Council have the pleasure of submitting to the Fellows the ordinary annual Report on the financial and general condition of the Society:—

Members.—The number of Fellows elected during the past year (ending April 30th, 1882) was 150. In the previous year, 1880-81, the total elections amounted to 168, and in 1879-80 the number was 207. The losses have been, by death 70,

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by resignation 53, and by removal on account of arrears of subscription 58. There is consequently a decrease on the year of 31; in the year 1879-80 the net increase was 58; and in 1878-9, 2. The total number of Fellows on the list (exclusive of Honorary Members) on the 1st of May was 3373.

Finance.—As will be seen by the annexed Balance Sheet, the total net income for the Financial year ending 31st December, 1881 (exclusive of balance in hand), was 8809*l.* 19*s.* 5*d.*, of which 6480*l.* 6*s.* 6*d.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1880, the total net income was 8599*l.* 18*s.* 4*d.*, and the amount of subscriptions, &c., 6236*l.*; in 1879 the two totals were 8979*l.* 14*s.* 10*d.* and 6182*l.* respectively, and in 1878, 8124*l.* 10*s.* and 6017*l.*

The net expenditure for the past year (exclusive of balance in hand) was 8362*l.* 5*s.* 6*d.*, including 816*l.* 17*s.* 1*d.* spent on Expeditions. The net expenditure in 1880 was 8454*l.* 1*s.* 10*d.*; in 1879, 6990*l.* 14*s.* 2*d.*; and in 1878, 6361*l.* 9*s.* 6*d.*

The Finance Committee of the Council have held, as usual, Monthly Meetings during the year, supervising the accounts of the Society. The Annual Audit was held on the 20th of April last, the Auditors being, on behalf of the Council, Sir Henry Barkly and S. P. Low, Esq.; and on behalf of the Fellows at large, E. O. Tudor, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council:—

“The Auditors appointed for the examination of the Accounts of the Royal Geographical Society for the year ending 31st December, 1881, beg to report that they have examined the Balance Sheet submitted to them, and compared it with the Cash Book, Bankers’ Book, Petty Cash Book, ‘Proceedings’ Advertisement Books, and other books of account kept by the Society, and have verified the Balance in the Bankers’ Pass Book and in the hands of the Accountant, checked the entries in the Cash Book, and examined all the vouchers for payments made, and that they have found the same to be correctly stated and sufficiently vouched.

“They have also had produced to them a letter from the Deputy Accountant of the Bank of England, and from Messrs. Cocks, Biddulph, and Co., Bankers, showing that the following investments were standing to the credit of the Society on the 31st December, 1881:—

	£	s.	d.
India 4 per Cent. Stock	1000	0	0
India 4 per Cent. Debenture Stock	2000	0	0
Great Western Railway 4½ per Cent. Debenture Stock	1800	0	0
London and North-Western Railway 4 per Cent. Debenture Stock	1000	0	0
North-Eastern Railway 4 per Cent. Debenture Stock ..	1000	0	0
Great Indian Peninsula Railway Guaranteed 5 per Cent. Capital Stock	4000	0	0
March Exchequer Bills	1000	0	0
Caledonian Railway 4 per Cent. Preference Stock, No. 1	2000	0	0
Consols (Lambert Donation)	526	6	4
Consols	4214	0	6

“The Auditors are pleased to find that the Annual Subscriptions have been paid more regularly than in former years, and that the arrears have been reduced to 1302*l.* This sum the Auditors, in accordance with precedent, value as an asset 651*l.*

“In consequence of the cost of Publications having increased, and the large sum paid to the Cameron Expedition Fund, no addition has been made to the Investments during the past year. The Investments and Assets of the Society on the

31st December, 1881, exclusive of the Map Collection and Library, amounted to 39,675*l.* 6*s.* 7*d.*, against 39,378*l.* 12*s.* 8*d.* on the 31st December, 1880.

"The accounts, books, and vouchers are well kept and in good order. No error was discovered, and the work of the Auditors was greatly facilitated by the easy production of the vouchers.

"S. P. LOW,
"E. O. TUDOR,
"HENRY BARKLY,
"J. D. THOMSON, } *Auditors.*

"20th April, 1882."

<i>Receipts.</i>	BALANCE SHEET FOR THE YEAR 1881.				<i>Expenditure.</i>					
1881.	£	s.	d.	£	s.	d.	1881.	£	s.	d.
<i>Balance in Bankers' hands 31st Dec. 1880 (excluding Draft not cashed)</i>	31	16	10				<i>House:—Taxes and Insurances, Repairs, Improvements and Furniture, Coal, Gas and Water-rates, &c. . . .</i>	..	..	294 16 4
<i>Do. Accountant's do.</i>	4	9	0	36	5	10	<i>Office:—Salaries and Gratuities, Stationery and Printing, Postages and Parcels, &c. . . .</i>	..	..	1,597 2 1
<i>Subscriptions:—</i>							<i>Library:—</i>			
<i>For the current year ..</i>	3,939	0	0				<i>Salaries, Books, &c. . .</i>	..	..	426 4 11
<i>Paid in advance .. .</i>	584	0	0	5,080	6	6	<i>Map-Room:—</i>			
<i>Arrears</i>	557	6	6	896	0	0	<i>Salaries and Gratuities, Maps, &c. . . .</i>	..	..	1,043 11 6
<i>Entrance Fees .. .</i>	..	..	..	41	0	0	<i>Meetings .. . . .</i>	..	..	201 17 7
<i>Life Compositions ..</i>	..	..	..	500	0	0	<i>Scientific Purposes</i>			
<i>Payments paid in error ..</i>	..	..	..	52	10	0	<i>Grant:—</i>			
<i>Parliamentary Grant ..</i>	..	..	..	140	0	0	<i>Instruction to Travel-</i>	..	..	141 9 6
<i>Royal Premium .. .</i>	..	..	..	736	14	6	<i>lers, Map of Eastern</i>	..	..	164 11 0
<i>Rent of Shop and Vaults</i>	..	..	..	2	2	0	<i>Equatorial Africa ..</i>	..	..	3,449 15 6
<i>Publications, Sale of, and</i>	..	..	..	40	0	0	<i>Medals and other awards</i>	..	..	26 0 0
<i>Advertisements .. .</i>	..	..	..	102	8	0	<i>Publications:—Printing</i>	..	..
<i>Loan of Diagrams .. .</i>	..	..	..				<i>Journal and Proceed-</i>	..	..
<i>Payments for Scientific</i>	..	..	..				<i>ings, Maps and Illus-</i>	..	..
<i>Instruction .. . . .</i>	..	..	..				<i>trations, &c. . . .</i>	..	..
<i>Repayment by African</i>	..	..	..				<i>Payments in error returned</i>	..	..
<i>Exploration Fund from</i>	..	..	..				<i>Expenditures:—</i>			
<i>amount recovered by</i>	..	..	..				<i>Payments for African</i>	102	8	0
<i>Sir J. Kirk, at Zanzibar</i>	..	..	..				<i>Exploration Fund ..</i>			
<i>Dividends:—</i>							<i>Final payment for</i>	714	9	1
<i>North-Eastern Railway</i>							<i>Cameron Expedition</i>			
<i>4 per Cent. Debenture</i>	39	0	0				<i>Fund</i>			816 17 1
<i>Stock 1000<i>l.</i></i>							<i>Donations:—</i>			
<i>Great Indian Peninsula</i>							<i>To the Palestine Ex-</i>	100	0	0
<i>Railway 5 per Cent.</i>	203	15	6				<i>ploration Fund ..</i>			
<i>Stock 4000<i>l.</i></i>							<i>Do., to the International</i>	100	0	0
<i>Great Western Railway</i>							<i>Congress at Venice..</i>			200 0 0
<i>4½ per Cent. Deben-</i>	74	13	4				<i>Balance in Bankers' hands 31st Dec. 1881</i>	475	16	10
<i>ture Stock [Davis</i>							<i>Do. Accountant's do.</i>	8	2	11
<i>Bequest] .. 1800<i>l.</i></i>										483 19 9
<i>London and North-</i>										
<i>Western Railway</i>										
<i>4 per Cent. Deben-</i>	39	0	10							
<i>ture Stock [Murchi-</i>										
<i>son Bequest] 1000<i>l.</i></i>	21	8	5							
<i>Exchequer Bills 1000<i>l.</i></i>										
<i>Caledonian Railway</i>										
<i>4 per Cent. Preference</i>	78	2	2							
<i>Stock .. 2000<i>l.</i></i>										
<i>Consols 3669<i>l.</i> 2<i>s.</i> 2<i>d.</i></i>	107	6	5							
<i>" [Back bequest]</i>	16	8	2							
<i>" 561<i>l.</i> 0<i>s.</i> 8<i>d.</i></i>										
<i>" [Trevelyan be-</i>	14	18	7							
<i>quest] 510<i>l.</i> 4<i>s.</i> 6<i>d.</i></i>										
<i>India Stock .. 1000<i>l.</i></i>	39	1	8							
<i>India 4 per Cent. De-</i>	78	3	4							
<i>bentures .. 2000<i>l.</i></i>										
				714	18	5				
				£	8,846	5 3				

REGINALD T. COCKS,
Treasurer.

Audited and found correct, the 20th day of April, 1882.

S. P. LOW,
E. O. TUDOR,
HENRY BARKLY,
J. D. THOMSON, } *Auditors.*
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STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year
1848 to the 31st Dec., 1881.

	Year.	Cash Receipts within the Year.	Cash Amounts invested in Funds.	Deducting Amounts invested in Funds; actual Expenditure.
		£ s. d.	£ s. d.	£ s. d.
	1848	696 10 5	.. ..	755 6 1
	1849	778 3 0	.. ..	1,098 7 6
	1850	1,036 10 5	.. ..	877 2 10
In 1855 a Treasury Grant of 1000 <i>l.</i> for the East African Expedition received.	1851	1,056 11 8	.. ..	996 14 7
	1852	1,220 3 4	.. ..	995 13 1
In 1860 a Treasury Grant of 2500 <i>l.</i> for the East African Expedition received.	1863	1,917 2 6	.. ..	1,675 6 0
	1864	2,565 7 8	.. ..	2,197 19 3
In 1869 Legacy of Mr. Benjamin Oliveira, 150 <i>l.</i> 17 <i>s.</i> 1 <i>d.</i>	1865	2,684 7 0	.. ..	2,636 3 1
	1866	3,372 5 1	533 10 0	2,814 8 1
In 1870 Legacy of Mr. Alfred Davis, 1800 <i>l.</i>	1867	3,142 13 4	378 0 0	3,480 19 9
	1868	3,089 15 1	.. ..	2,944 13 6
In 1871 Legacy of Sir Roderick Mur- chison, 1000 <i>l.</i>	1869	3,471 11 8	950 0 0	3,423 3 9
	1860	6,449 12 1	466 17 6	5,406 3 7
	1861	4,792 12 9	1,368 2 6	3,074 7 4
In 1872 Amount of Mr. James Young's Grant for the Livingstone Congo Expedition, 2000 <i>l.</i>	1862	4,659 7 9	1,369 7 6	3,095 19 4
	1863	5,256 9 3	1,837 10 0	3,655 4 0
	1864	4,977 8 6	1,796 5 0	3,647 7 10
In 1874 Amount of Mr. James Young's Grant for the Livingstone Congo Expedition, 1041 <i>l.</i> 14 <i>s.</i>	1865	4,905 8 3	1,041 5 0	4,307 4 5
	1866	5,085 8 3	1,028 15 0	4,052 15 0
	1867	5,462 7 11	1,029 0 6	3,943 17 4
	1868	5,991 4 0	1,867 3 9	4,156 17 10
In 1876 Special Parliamentary Grant of 3000 <i>l.</i> towards the Expenses of the Cameron Expedition.	1869	6,859 16 0	2,131 5 0	4,646 0 8
	1870	8,042 6 1	3,802 6 0	3,845 10 6
	1871	6,637 3 7	1,000 0 0	3,726 4 4
In 1877 Donation of 500 <i>l.</i> by Mr. C. J. Lambert in carrying out the pro- visions of his father's will.	1872	8,119 7 9	1,999 4 6	5,871 13 2
	1873	7,761 18 10	2,015 1 8	6,097 13 6
	1874	8,753 5 10	499 0 0	7,876 2 3
	1875	7,934 15 10	2,002 7 6	5,683 4 10
In 1878 Legacy of Admiral Sir George Back, 540 <i>l.</i>	1876	11,611 11 8	.. ..	6,870 13 1
	1877	7,950 1 11	2,538 2 0	8,940 17 11*
	1878	8,124 10 0	3,000 0 0	6,361 9 6
In 1879 Legacy of Sir W. C. Tre- velyan, 500 <i>l.</i>	1879	8,979 14 10	1,551 10 10	6,990 14 2
	1880	8,599 18 4	1,567 5 1	8,454 1 10†
	1881	8,809 19 5	.. ..	8,362 5 6‡

* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.

† This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.

‡ This sum includes the payment of 102*l.* 8*s.* to the African Exploration Fund; also 714*l.* 9*s.* 1*d.*, the final payment for Cameron Expedition Fund.

STATEMENT OF ASSETS—31st December, 1881.

	£	s.	d.
Freehold House, Fittings, and Furniture, estimated (ex- clusive of Map Collections and Library insured for 10,000 <i>l.</i>) .. .. .	..	20,000	0 0
Investments (amount of Stock), as detailed in the above Report of the Auditors .. .. .	..	18,540	6 10
Arrears due on December 31, 1881 £1302			
Estimated at		651	0 0
Balance at Bank	£475	16	10
„ in Accountant's hands	8	2	11
		483	19 9
Total	£39,675	6	7

Publications.—The monthly 'Proceedings' has been issued with undeviating regularity since the last Report, and continues, it is believed, to give satisfaction to Fellows and the public. The twelve numbers for 1881 form a volume (including the Index) of 802 pages, illustrated by 24 original maps and 14 pictorial engravings. The cost of the volume, including 607*l.* 16*s.* 7*d.* for maps, and 269*l.* 10*s.* 7*d.* for

free delivery to Fellows, has been 2702*l.* 18*s.* 11*d.*; from which has to be deducted 626*l.* 7*s.* 7*d.* received from sales to the public and advertisements.

The 50th volume of the 'Journal' was published soon after last anniversary. This volume, as Fellows have been already informed, concludes the series of the 'Journal.' The new publication entitled 'Supplementary Papers,' intended for the reception of Memoirs which are too long or elaborate for the monthly 'Proceedings,' commenced with the present year with Part 1 of Vol. I., containing Mr. Baber's reports of his 'Journeys in Western China.' The Part is issued to Fellows on the same conditions as the old 'Journal,' viz. free on application at the Society's Office.

Scientific Purposes Grant.—Since last Anniversary Meeting thirteen intending travellers have received instruction, under Mr. Coles, in Practical Astronomy at the Society's Observatory, and in route-surveying in the country. Some of these gentlemen have since left England for the following destinations:—East Africa, North Borneo, the Pacific, China, Abyssinia, and the river Congo. Three pupils are at present under instruction. The total number of lessons given during the year is 320.

The first Part of the Society's large Map of Eastern Equatorial Africa, consisting of 7 sheets, was published in December last, and the second Part will be ready for delivery in a few days. 35*l.* out of the Scientific Purposes Grant have been paid during the year to Mr. Ravenstein on account of the Map.

Expeditions: Grants of Instruments to Travellers.—The sum of 714*l.* 9*s.* 1*d.* was expended during the year in discharge of the remaining bills of the Cameron Expedition which had not before been presented for payment at Zanzibar by their holders, Arab traders to the west of Lake Tanganyika.

A grant of 100*l.* was made during the year to the Palestine Exploration Fund in aid of their new Expedition to the East of the Jordan; and another grant of like amount to the International Geographical Congress at Venice in September last.

Instruments to the value of 105*l.* 7*s.* have been supplied to the following travellers:—Mr. A. R. Colquhoun, for work in South-Western China, 8*l.* 10*s.*; Commander V. L. Cameron, R.N., West Africa, 15*l.* 5*s.*; Rev. T. Wakefield, East Africa, 28*l.* 14*s.* 6*d.*, and Mr. William Appel, Congo River, 52*l.* 17*s.* The instruments which had been lent to Mr. Joseph Thomson have been returned, and some of those which were supplied to the late Captain T. L. Phipson-Wybrants.

Library.—855 books and pamphlets have been added during the past year; 744 by donation or exchange, and 111 by purchase. The donations include a gift of 137 bound volumes of works on geographical subjects, in excellent condition, presented by the Very Rev. the Dean of Rochester. The system of presentation of new works by publishers, with the object of obtaining notice in the Bibliography of our 'Proceedings,' has now materially extended both on the Continent and at home.

117 pamphlets and small works have been put in covers on the Society's premises, and 409 volumes have been bound.

The sum of 119*l.* 3*s.* 3*d.* has been expended in purchasing books, and the further sum of 67*l.* 12*s.* 3*d.* in binding for the Library.

Among the more important accessions are:—A very fine copy of Dumont D'Urville's 'Voyage de la Corvette L'Astrolabe,' with the Atlases of plates, &c., complete; the Account of the Operations of the Great Trigonometrical Survey of India, vol. vi., Synopsis of Results, vols. x. to xiii., and General Report on the Survey, 1879–80, the continuations of the Indian Marine Survey Reports, and of Max Müller's 'Sacred Books of the East,' Hunter's Imperial Gazetteer of India, and other minor publications (presented by H.M. Secretary of State for India; the 'Gazetteer' also by the Publishers); the continuations of the Memoirs and Records

of the Geological Survey of India, and vol. iii. of the Manual of the Geology of India, by V. Ball (presented by the Indian Government, through Dr. Oldham, the latter also by the Author); Edgar's Report on Visit to Sikhim (presented by the Marquis of Ripon); Rawlinson's 'Herodotus,' 4th edition; various publications of, and duplicates of work presented to, the Meteorological Office (from the Office, through Mr. R. Scott); continuations of the 'Journal des Museum Godeffroy,' 'Midden-Sumatra' (from Prof. P. J. Veth), Reclus's 'Géographie Universelle' (Author), the 'Encyclopædia Britannica' (Messrs. A. and C. Black), St. Martin's 'Nouveau Dictionnaire de Géographie Universelle,' Howorth's 'History of the Mongols,' 'Meddelelser om Gronland' (Admiral Irminger), the Hakluyt Society's Publications, Burmeister's 'Description de la République Argentine' (Author), Nachtigal's 'Sahara und Sudan' (Author), and the United States Surveys under King and Powell (presented by the U.S. Government); Lepel Griffin's 'Punjab Chiefs' (Author); Capello and Ivens's 'De Benguela ás Terras de Jácca' (Author); General Strelbitsky's 'Superficie de l'Europe' (Author); Freeman's 'Historical Geography of Europe'; Führer's 'Itinerarium Ægypti'; Gilbertus 'De Magnete'; Olascoaga's 'Estudio topografico de la Pampa y Rio Negro' (H. E. the Argentine Minister); D'Abbadie's 'Géodesie d'Éthiopie'; Brugsch Bey's 'History of Egypt'; Godinho de Eredia, Malacca, &c.; Rohlf's 'Kufra'; Du Chaillu's 'Land of the Midnight Sun,' and Nordenskiöld's 'Voyage of the Vega' (Authors); De Saulcy's 'Jérusalem'; 'Les Alpes,' by Civiale; the Memoirs of the Survey of Western Palestine, so far as published; the Zoology and Chemistry of the Norwegian North Atlantic Expedition (Mr. R. Collett); and a collection of memoirs and plans, &c., on the waterways of Central Europe, with special reference to the regulation of the overflow of the Danube, by Enea Lanfranconi (Author).

The second Supplement to the Alphabetical Catalogue of the Library, covering the additions from the end of 1870 to the end of 1880, has been printed, and has been for some time in course of delivery to the Fellows who have applied for it. It contains 380 pages, as against the 135 pages of the first Supplement, and the 541 pages of the original Catalogue; and, though practically compiled on the same basis as its predecessors, further facilitates search by its system of cross references and connective treatment of the publications of Surveys, &c.

A general account of the rise and progress of the Library has been prepared by the Librarian, and is published in Mr. C. R. Markham's 'Fifty Years' Work of the Royal Geographical Society,' pp. 100-105.

To the general observations as to the use and scope of the Library appended to former Council Reports may now be added the remark, that it will be only possible for a very short time to find room for the constantly increasing additions in the space at present available on the Society's premises.

Map Room.—The accessions to the Map-Room Collection since the last Anniversary Meeting comprise, 657 Maps and Charts on 984 sheets; 11 Atlases, containing 193 sheets of Maps, and 41 Photographs and Views. Of these 37 Maps on 479 sheets, 5 Atlases, consisting of 75 Maps, and 26 Views have been purchased.

The accessions of last year were in excess of those of the present year, by 631 Maps on 1529 sheets, 6 Atlases, and 98 Photographs and Views. This difference is accounted for by the fact, that during the years 1880-81 two large collections of Maps were presented to the Society.

Among the most important donations to the Map-Room Collection are:—301 Sheets of the Ordnance Survey of the British Isles, on various scales (presented by the First Commissioner of Works, through the Director-General of the Ordnance Survey). 128 Charts of the British Admiralty (presented by the Lords Commissioners of the Admiralty, through the Hydrographer). 24 Sheets of Maps (pre-

mented by the Intelligence Branch of the Quartermaster-General's Department). 15 French Charts (presented by the *Dépôt des Cartes et Plans de la Marine*). 21 Sheets of United States Charts (presented by Captain J. C. P. de Krafft, U.S.N., Hydrographer to the Bureau of Navigation). 220 Sheets of the various Indian Government Surveys (presented by H.M. Secretary of State for India). 17 Maps published in '*Petermann's Geographische Mittheilungen*' (presented by Dr. E. Behm). 7 Sheets of '*Sveriges Geologiska Undersökning*' (presented by the Director of the Survey). 17 Maps published by Dietrich Reimer (presented by the Publisher). 32 Charts, Plans, Views, &c. (presented by Prof. W. T. Thiselton Dyer). 59 Sheets of Danish Charts (presented by the Meteorological Office, London). *Carte de l'Indo-Chine Orientale* (presented by the French Geographical Society). Parts V. to XV. of Bevan's Statistical Atlas (presented by W. and A. K. Johnston).

The Maps in the Society's Collection have been made frequent use of by Fellows, public officers, and the general public; and the large Maps and Views have been lent for the purpose of illustrating lectures at public institutions, as well as to private individuals. Twelve new Diagrams have been constructed on the premises.

A Catalogue of the Map-Room Collection, arranged alphabetically and geographically, has been completed since the last Anniversary Meeting, and is now ready for issue.

The adoption of the above Report was moved by Mr. J. R. ANDREWS, seconded by Mr. W. B. D'ALMEIDA, and unanimously agreed to.

PRESENTATION OF THE ROYAL MEDALS.

The Royal Medals of the year for the Encouragement of Geographical Science and Discovery had been awarded by the Council as follows:—

The Founder's Medal to Dr. GUSTAV NACHTIGAL, for his great journey in the years 1869 to 1875 through the Eastern Sahara, during which he explored the previously unknown regions of Tibesti and Baghirmi, added much to our knowledge of Lake Chad, and returned by a route previously untrodden by Europeans through Wadai and Darfur to Upper Egypt; also for the carefully prepared narrative of his travels now in course of publication, which is illustrated by many maps, and contains a large amount of original information regarding the countries he visited and their inhabitants.

The Patron's Medal to Sir JOHN KIRK, K.C.M.G., M.D., H.M.'s Consul-General at Zanzibar, for his long-continued and unremitting services to geography:—first as naturalist and second in command to Dr. Livingstone in the Zambesi Expedition of 1858–63—during which he took a prominent part in all the new discoveries and explorations, enriching the results by his scientific observations:—and secondly by the great assistance he has since rendered to successive expeditions in East Africa during his many years' residence as H.M.'s Consul-General at Zanzibar.

In the absence of Dr. Nachtigal, who has within the past few days been appointed Consul-General for the German Empire at Tunis, his medal was received by His Excellency Count Münster, German Ambassador.

The PRESIDENT said:

It now becomes my pleasing duty to present the two great prizes of the year—the Royal Medals entrusted by the Crown to the Royal Geographical Society—the first of which is called the Founder's Medal, after King William the Fourth, in whose reign this Royal premium was first given; and the second, the Patron's Medal, after Her Majesty the Queen. We have selected for the Founder's Medal Dr. Gustav Nachtigal. Dr. Nachtigal, I am sorry to say, is not present here to-day, his services having been honourably and appropriately recognised by his appointment to

the office of Consul-General to the German Government at Tunis; but I am happy to say His Excellency Count Münster is present to do honour to his countryman and to geographical science, and as the diplomatic representative of his country to receive the medal destined for Dr. Nachtigal. Dr. Nachtigal's journeys were made between the years 1869 and 1874; but it is only recently that the Society has been in a position to estimate their full value and worth. Like so many of his countrymen, he made Tripoli the base of his operations against the centre of Africa; and he has described in language admirably vivid and picturesque the various countries through which he passed during his long sojourn in those regions. Having first gone to Murzuk, the capital of Fezzan, and remained there for some time, he determined, against the warnings and advice of the most competent persons, to proceed to Tibesti, a country of great interest, which had never up to that time been visited by any European traveller, and I believe never has been since; and certainly after reading the account that Dr. Nachtigal has given of his experience of that country I cannot think that many would be tempted to repeat the experiment. In that expedition into the mountains of Tibesti he went through all the horrors of thirst and hunger, and incurred the greatest risk of losing his life. He was also constantly exposed to the more humiliating suffering of being the victim of depredators who probably are amongst the most shameless and skilful in the world. At any rate, that is the conclusion I have formed of the natives of Tibesti, after having read the accounts of travellers in other countries where also honesty is not considered the best policy. Dr. Nachtigal returned to Murzuk, and continued his journey across the desert of Sahara to Lake Chad. I will not go into the details of his journeys round this great lake; suffice it to say that he visited Kanem on its north-eastern side, where a distinguished countryman of his, Maurice de Beurmann, had been murdered, and penetrated into the wild regions of the Shari to the south-east. He then proceeded eastward into Wadai, where another eminent German traveller, Dr. Vogel, had met his death, and finally made his way through Darfur and Kordofan to the Upper Nile, where he found himself in a comparatively civilised region. We know by experience that however interesting their expeditions may be, travellers are not always successful in arousing the interest of their readers, because they lack literary skill; but that cannot be said of Dr. Nachtigal, whose work seems to me almost as remarkable for its literary excellence, as for the permanent value of its scientific information. Having read a large portion of his work, it seems to me that no traveller in this or any other age has exceeded him in all the essential requisites of a great and instructive traveller. To great powers of physical endurance, to the greatest courage, he adds a due amount of patience, caution, and perseverance. In addition to that, he is an accomplished ethnologist, an excellent naturalist, and in all the essential qualities of an observer I think few men can surpass him. Such being the case, you will agree with me that the Society could not well have bestowed their medal upon a worthier recipient; and I heartily congratulate Count Münster on this addition to the illustrious roll of travellers which his country has sent forth.

His Excellency Count MÜNSTER, in acknowledging the receipt of the medal, said this was the second time he had had the great pleasure to receive on behalf of a fellow-countryman the greatest honour which the Royal Geographical Society could bestow. He could assure them that he felt proud that a countryman of his should meet with such great distinction. He thanked the President for the kind words which he had spoken with regard to Dr. Nachtigal. He felt that Dr. Nachtigal deserved what had been said about him, and while regretting that he could not be present, would be most grateful for the honour conferred upon him. The new duties

that he had undertaken made it impossible for him to leave the rather important post which the German Government had confided to him. The appointment of Dr. Nachtigal as Consul-General at Tunis showed that the German Government recognised the merits of this very courageous and very scientific traveller. In conclusion, he expressed a hope that whenever in distant regions Christianity was to be promulgated, and civilisation to be brought into barbarian countries, English and Germans would always be found side by side.

The PRESIDENT, in presenting the Victoria Medal, said:—I have now the very great pleasure—a personal pleasure I may say, and it will be a personal pleasure, I think, to a great number of those who are present to-day—to announce the adjudication of our Patron's Medal to Sir John Kirk. During the last twenty years there have been few names more familiar in connection with African exploration than that of Sir John Kirk. He was first known as a member of the Zambesi expedition headed by our illustrious countryman, Dr. Livingstone, and during five years he may be said to have occupied the foremost post in all the work of that great national undertaking. In all the pioneer explorations of the expedition, his place was by the side of his leader; and in the journey which followed the discovery of Lake Nyassa, Sir John Kirk in command of the boat party advanced further towards the head of the lake than had been reached by any other European. Afterwards he conducted a considerable amount of original exploration up the Rovuma, in portions of the Zambesi, and along the great river Shire which connects the Nyassa with the Zambesi. In all these expeditions most valuable work was done, and the result was communicated in two papers, among the best ever read before the Geographical Society, which were published in the journals. But eminent as Sir John Kirk's services were as an original discoverer, he has perhaps still more contributed to the objects of this Society by the use he has made of the important position he has held at Zanzibar. For fifteen years he has lived at Zanzibar either as Assistant Consul or as Consul-General and Resident there. During that time travellers, not from England alone, but from every country in Europe, have experienced the immense advantage of his aid and advice, which have been most promptly and generously given. How valuable these have been it is hardly for me to say, because scarcely a book has been published of travels into that interesting part of Africa, which has so attracted and riveted the attention of all geographers and philanthropists of late years, which has not dwelt with warm, enthusiastic gratitude upon the invaluable services rendered by Sir John Kirk. The very last expedition sent out by this Society in that direction, headed by the accomplished Keith Johnston, who, as you know, died soon after he commenced his journey, but which was happily carried to an end by Mr. Joseph Thomson, owed its success in great part to the advice and assistance rendered by Sir John Kirk. It is unnecessary for me to enlarge upon the immense value of these services. Without them it cannot be too much to say that several of the most successful expeditions might have failed. I therefore think that I am only anticipating your wishes, and that I shall meet with your most cordial approval when I present one of the two greatest honours that we can possibly confer upon Sir John Kirk.

Sir JOHN KIRK, in returning his cordial thanks for the high honour conferred upon him, and for the manner in which the President had classed his name with the long list of distinguished explorers and scientific travellers, said it was with the greatest pleasure that he looked back to the time which he had spent in Central Africa; but he felt that any original exploration which he had carried out took place so many years ago that that alone could not in any way confer upon him a title to the Patron's Medal of the Royal Geographical Society. It was only in consequence of the assistance which his official position had enabled him to give to

other travellers that he had any claim to such an honour. It had been a pleasure to him to assist expeditions from any nation, but especially expeditions from the Royal Geographical Society, with his advice so as to enable them, as far as possible, to make sure of their progress in the interior. At the beginning of his African career he had the good fortune to be associated with Dr. Livingstone, the prince of African explorers; and it was to his guidance and the teaching he received from him that he was indebted for all that he had been able to do in Africa with regard to the suppression of the slave trade, and in opening up the continent to commerce and civilisation. In coming back after a long stay in a foreign country it was a great pleasure to him to receive the thanks of his countrymen. He thanked the President for the handsome way in which he had been pleased to speak of his services.

THE AWARD OF THE MURCHISON AND BACK GRANTS.

The PRESIDENT next announced that the Council had this year awarded the proceeds of the grants bequeathed by Sir Roderick Murchison and Sir George Back, as follows:—The Murchison Grant to the Rev. THOMAS WAKEFIELD, of Ribé near Mombasa, East Africa, for the services to Geography rendered by him during his twenty years' residence in East Africa, and especially for his Paper and Map, published in the Fortieth Volume of the 'Journal,' on "Caravan Routes from the Coast to the Interior," and his account of his "Fourth Journey to the Southern Galla Country," read at the Geographical Section of the British Association in 1879; also to aid and encourage him in the researches he is still making in that little-known region. The Back Grant for 1882, to H. E. O'NEILL, H.M.'s Consul, Mozambique, "Towards the purchase of instruments for the important explorations in which he is engaged in the regions between Mozambique and Lake Nyassa."

PRESENTATION OF THE PUBLIC SCHOOLS' PRIZE MEDALS.*

The medals had been awarded as follows by the Examiners, who were, for PHYSICAL GEOGRAPHY, Professor H. N. Moseley, M.A., F.R.S., and for POLITICAL GEOGRAPHY, Sir Arthur Blyth; the special subject for the year being Australia, exclusive of Tasmania.

PHYSICAL GEOGRAPHY.—*Gold Medal*—Hubert Llewellyn Smith, Bristol Grammar School. *Silver Medal*—Albert Richard Sharp, Dulwich College. *Honourably Mentioned*—Andrew Claude Crommelin, Marlborough College; Montague Edward Fordham, London International College; Samuel William Carruthers, Dulwich College; Albert Lewis Humphries, Liverpool College.

POLITICAL GEOGRAPHY.—*Gold Medal*—Frank Herman Becker, Dulwich College. *Silver Medal*—Sydney Charles Farlow, Harrow School. *Honourably Mentioned*—Robert Galbraith Reid, Dulwich College.

Mr. FRANCIS GALTON (Chairman of the Public Schools' Prizes Committee) announced that the Geographical Examinations had again been successful. This year, as on many previous occasions, the medallists were well worthy of the honour.

* The other medals, for the promotion of Geographical Education, placed by the Society at the disposal of the syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1881. Oxford (June). *Silver Medal*—F. W. Lloyd, Liverpool. *Bronze Medal*—E. H. C. Walsh, Nottingham.

Cambridge (December). *Silver Medal* (Physical Geography)—E. H. Stevens, Brighton. *Silver Medal* (Political Geography)—A. J. Fressland, Bedford.

One of the Examiners, Professor H. N. Moseley, in his report said, "In conclusion, I have to congratulate the Society on the good work effected by this annual award of School Medals. As my experience as Examiner in Geography increases, the more I am convinced of its pre-eminent fitness as a subject of education, and the more I deplore that it is almost entirely neglected as such in this country. Competent teachers of the subject appear to be scarce indeed; but it is amply apparent from the Society's examinations that most valuable results can be produced by really able instructors." This was the fourteenth year of the examinations, and as four medals were given annually, fifty-six boys had won medals, and ninety-eight had been honourably mentioned, forming a total of 154. Fifty-two schools had been invited to compete, and forty-one had accepted the invitation. The head of the successful schools was undoubtedly Liverpool College, but Dulwich came next, having during the last six or seven years been pre-eminently successful. Not a year had elapsed since 1875 in which Dulwich had not gained one medal, and for the last three years it had always gained two—one in each branch. The head master of Liverpool was now about to retire into private life, but this occasion ought not to be allowed to pass without testifying to the debt owed to him by the Society for his efforts in the cause of geographical education, his continued advocacy of the advantage of geography as a subject of education, his publications, and more especially his great success as a teacher. They had been urged to invite Scotch and Irish schools, where the boys were not of the same age as in the English schools, and it was not to be expected that they would compete; but as a matter of fact, out of the five Scotch schools invited two had sent candidates, and obtained two honourable mentions, while Ireland had secured one honourable mention. Neither Rugby, Shrewsbury, King's College, nor Saint Paul's had ever sent a candidate. On the whole, he thought the Society might look back to what had been done with considerable satisfaction. There was no doubt that geographical education was largely improving, and the opinions of many masters could be quoted testifying to the interest that the examinations excited among the boys.

The successful candidates, who were in attendance, were then presented with the medals.

The PRESIDENT announced the special subject for the examination of 1883—the Dominion of Canada.

The Ballot for the Council of 1882-3 then took place.

The PRESIDENT delivered the Annual Address (*ante*, June number, p. 329).

General Sir James HILLS proposed a vote of thanks to the retiring Members of Council, Committees, Auditors, and Scrutineers.

The PRESIDENT seconded the motion, which was agreed to.

The Result of the Ballot was then declared as follows (the names printed in *italics* being new Members, or those who change office).

President: Right Hon. Lord Aberdare, F.R.S. *Vice-Presidents*: Sir Rutherford Alcock, K.C.B.; Major-General Sir H. C. Rawlinson, K.C.B.; Sir Barrow H. Ellis, K.C.S.I.; *Right Hon. Sir H. Bartle E. Frere, Bart.*, G.C.B.; *General Sir J. H. Lefroy, B.A.*, K.C.M.G.; R. H. Major, Esq., F.S.A. *Treasurer*: Reginald T. Cocks, Esq. *Trustees*: Lord Houghton, D.C.L.; Sir John Lubbock, Bart., F.R.S. *Secretaries*: Clements R. Markham, Esq., C.B.; Douglas W. Freshfield, Esq. *Foreign Secretary*: Lord Arthur Russell, M.P. *Members of Council*: John Ball, Esq., F.R.S.; *Sir Henry Barkly*, G.C.M.G.; *E. H. Bunbury, Esq.*; Sir T. Fowell Buxton, Bart.; Right Hon. Lord Cottesloe; *R. N. Cust, Esq.*; James Fergusson, Esq., F.R.S.; *Francis Galton, Esq.*, F.R.S.; Colonel H. H. Godwin-Austen, F.R.S.; Colonel J. A. Grant, C.B., C.S.I.; *Sir John Kirk, M.D.*, K.C.M.G.; J. K. Laughton, Esq.; *Right Hon. Sir Austen H. Layard*, G.C.B.; S. P. Low, Esq.; *W. Mackinnon, Esq.*; Captain Sir G. S. Nares,

R.N., K.C.B.; *Sir Rawson Rawson*, K.C.M.G.; General R. Strachey, R.E., C.S.I.; Sir Richard Temple, Bart., G.C.S.I.; General Sir H. L. Thuillier, C.S.I., F.R.S. Colonel Henry Yule, C.B.

The proceedings then terminated.

THE ANNIVERSARY DINNER.

The annual dinner of members and their friends took place in the evening of the same day, at Willis's Rooms, St. James's; Lord ABERDARE, the President, in the Chair. Among the distinguished guests and Fellows of the Society present were the following:—

H.E. Count Münster, the German Ambassador; Earl Ducie; Sir Charles Dilke, M.P.; H.E. the Netherlands Minister; H.E. the Swedish and Norwegian Minister; Sir Thomas Brassey, M.P.; A. J. Mundella, M.P.; Sir Henry Parkes; Sir George Bowen; Sir John Kirk; H.E. the Japanese Minister; Sir Bartle Frere; Sir T. Fowell Buxton; The Comte de Franqueville; Sir H. Barkly; Professor H. Giglioli; Sir Arthur Phayre; Sir P. Cunliffe Owen; Mr. W. Mackinnon; Sir George Chambers; The Bishop of Ballarat; Mr. Edward Whympere; Mr. R. G. W. Herbert; &c.

The toasts were:—1. Her Majesty the Queen, Patron of the Society; 2. The Prince of Wales, Vice-Patron, the Duke of Edinburgh, Honorary President, and the other members of the Royal Family: both proposed by the President. 3. The Medallists of the year, by the President. To this the German Ambassador responded on behalf of Dr. Nachtigal, and Sir John Kirk in his own name; the former expressing his assurance that his countryman at Tunis would follow the excellent example of Sir John Kirk, in using his position as German Consul General to assist geographical explorers in Northern Africa as Sir John had done on the East Coast. 4. The Foreign Office and the Admiralty. In proposing this toast the President alluded to the amicable relations which had always existed between these departments of the Government and the Royal Geographical Society, and acknowledged the assistance and information which the Society had so frequently received from the present, as well as from preceding Ministers. Sir Charles Dilke returned thanks on behalf of the Secretary of State and Lord Tenterden, and Sir Thomas Brassey on that of the Admiralty. Sir Charles said it had given the Foreign Office great pleasure to communicate from time to time, and with as much speed as any Government department used (laughter), such information as they thought might be interesting or useful to the Society. The Society, on the other hand, had frequently given information, particularly with regard to Africa, of high value to the service of the Government—information which could not possibly have been derived from any other source. He remembered being asked a question in the House of Commons—he was sometimes asked questions in the House of Commons (laughter)—with reference to a part of Africa which was not less than 2000 miles from the nearest British Consul, and certainly on that occasion he was indebted to the Society for any information which, under those circumstances, he was able to give the House. 5. The PRESIDENT, proposed by Sir Bartle Frere, and briefly responded to by Lord Aberdare; after which the company separated.

REPORT OF THE EVENING MEETINGS, SESSION 1881-2.

Thirteenth Meeting, 12th June, 1882.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*Edward Harry Day, Esq.; James Hingston, Esq.; Joseph Martin, Esq.; Samuel Browning Power, Esq.; Henry Cooper Rose, Esq., jun.; Geo. B. Starkweather, Esq.; Major-General F. C. Trevor (late R.A.); James William Wells, Esq.; Major W. J. Williamson, C.I.E., Beng. Staff Corps.*

A paper was read entitled—

“Explorations in South Central Madagascar.” By the Rev. W. Deans Cowan.

Will be published, with map and discussion, in a subsequent number of the ‘Proceedings.’

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—May 19th, 1882: M. HENRI DUVEYRIER, President of the Central Commission, in the Chair.—The Chairman announced the presence at the meeting of M. Ledoux, late French Consul at Zanzibar, who was about to assume a similar post at Mogador, and who during his residence in East Africa had been a very active correspondent of the Society. M. Torres Campos, Assistant Secretary of the Geographical Society of Madrid, was also present.—A copy of the map of the Department of the Seine (scale 1 : 20,000), in 36 sheets, and coloured, which has just been completed by the Geographical Service of the Army, was presented by the Minister of War.—M. Mahé de la Bourdonnais forwarded a collection of photographs of types, monuments, &c., in British Burma.—The widow of Lieutenant Paul Cave, aide-de-camp of the late Admiral de Launéan, who, like himself, died during the late epidemic of yellow fever in Senegal, made a present to the Society of some volumes on Australia and New Zealand collected by her husband, which had been sent to the Melbourne Exhibition; M. Cave was a distinguished naval officer, and had furnished geographical papers to the *Revue Maritime et Coloniale* and other publications.—The Geographical Society of Toulouse announced its formation by transmitting a copy of the first number of its *Bulletin*; and the Geographical Society of the Meuse at Bar-le-Duc forwarded the programme of a geographical and ethnographical exhibition which it is preparing for next year.—The United States Coast Survey announced the despatch of a relief map of the Gulf of Mexico prepared from recent surveys.—M. Paul Dupuy forwarded a summary of a lecture delivered by M. Henri Kiepert before the Royal Academy at Berlin in October 1881, which has been published in the *Monatsberichte*, respecting the route followed by the Florentine merchant, Fr. Balducci Pegolotti, in the fourteenth century, between the Gulf of Alexandretta and Tauris.—A letter was read from M. Dutreuil de Rhins remarking on the communication read at the last meeting respecting Lieutenant A. Gautier's journey in the north of Cochin China; he pointed out that the traveller had not ascended the Donnai so far as MM. Septans and Neïs, since he stopped four or five days' journey beyond the frontier of Cochin China, but that no doubt he would be more fortunate in his ascent of the Song-Bé.—M. de Bizemont gave some news of M. de Brazza from a letter from M. Mizon, written from Franceville on February 10th, 1882. The explorer had taken the direct and completely unknown road to Mayombé.—M. Gauthiot, General Secretary of the Society of Commercial Geography of Paris, also furnished some news respecting certain travellers,—Dr. Paul Neïs, who

is expected immediately at Brest from Cochin China, and M. Deloncle, who is in the south of Hindostan, whence he will shortly proceed to the Malay Peninsula to visit the Isthmus of Kraw.—The meeting was brought to a conclusion by a communication from M. R. de Semellé on the Indian population of the United States.

— June 2nd, 1882 : M. HENRI DUVEYRIER, President of the Central Commission, in the Chair.—The Chairman announced that M. de Brazza had arrived a few hours before, and that a deputation of the Society had gone to the station to receive him. He referred in a few words to M. de Brazza's explorations between the Ogowé and the Congo, and the establishment of three stations which he has founded in that part of Africa. He added that M. de Brazza would shortly address the Society on the results which he had achieved during his journeys.—M. M. Victor Guérin, Vice-President of the Society, announced his approaching departure for Palestine for the purpose of completing the work which he published at the beginning of this year on the Holy Land (Paris: Plon, 1882). On the present occasion M. Guérin will visit Lebanon, the coast of Arabia Petæa, &c.; and he will thus have followed the Jews in all their wanderings.—A letter was read from the Governor of Cochin China, dated Saigon, April 17th, in which he stated that MM. Septans and Gauroy had not been able to accomplish their journey in the interior of Indo-China, and that they had been stopped by the Laotiens 75 miles from Quinhon, and then obliged to retreat towards Cambodia, after having destroyed their baggage with their own hands. It would seem that in Asia, as well as in Africa, slave merchants are opposed to Europeans penetrating into the interior of the country. On the other hand, Lieutenant Gautier, from whom some interesting letters were recently read, was pursuing his journey in spite of all difficulties and obstacles. At the end of March he was at Brelam (or Brelum), and letters from him, dated from the river Caglè, contained interesting details in regard to the Mois tribes.—Captain Aymonier, who is charged with an archaeological mission, is now engaged in exploring the country between Pnum-Penk and Chaudoc, where he has already collected numerous inscriptions.—It was also stated that the works for a line of overland telegraph were about to be commenced between Saigon and Bangkok by way of Pnum-Penk, Pursat, and Battambang. This line, which will be about 500 miles long, will, it is hoped, be ready in six months.—The Argentine Geographical Institute addressed the Society to inquire whether it would support a project, laid before the Venice Congress by their delegate Captain Moyano, for raising a statue to Christopher Columbus at the entrance to the Panama Canal.—Another statue to the memory of the learned Egyptologist, Mariette Bey, will be inaugurated at Boulogne-sur-Mer on July 16th, and the municipality of that town asked the Society to send two delegates to the fête.—It was announced that the Annual Meeting of the French Association for the Advancement of Science will be held at La Rochelle from the 24th to the 31st of August.—Prince di Teano, President of the International Geographical Congress at Venice, forwarded a printed list of the resolutions adopted by the Congress.—M. Cheysson presented the second part of the map of France (scale 1:200,000) which he is preparing for the Ministry of Public Works, in which he is the Director of the department of Maps and Plans. This map in three colours will include 135 sheets, of which 16 have already appeared. M. Cheysson also announced the publication of a map which is to show the condition of advancement of large-scale maps in Europe.—Extracts of letters from the Abbé Desgodins (July 1881 to April 1882) respecting his journey in the south-eastern portion of Tibet were presented by M. Dutreuil de Rhins, and will be found in the *Compte Rendu des Séances*.—M. Antoine d'Abbadie, of the Institute, read a memoir on Geographical Orthography, and M. Martin La Meslée another on the eastern portion of Australia, both of which will be published in the quarterly *Bulletin*.—M. L. Simonin disputed the conclusions arrived at by M. de Semellé, who at the

last meeting had advanced the statement that the Indians in the United States were not only not diminishing, but were even increasing in number.—Just as the Meeting was breaking up, M. de Brazza entered the hall, and was most enthusiastically received.

Geographical Society of Rome.—May 14th, 1882: Signor ALLIEVI, Vice-President, in the Chair.—Professor Guido Cora delivered an address on the Physical Geography of the Sahara, in which he referred first to the small number of Italian travellers who have visited this part of Africa, which has been so erroneously described even in the most recent treatises on geography, being represented in them as a sea of moving sand, with a few small oases scattered here and there. He next described how the recent journeys of foreign travellers had laid bare the secrets of this vast region. The Desert of Sahara is an immense tract of country, with a mean elevation of from 1300 to 1650 feet above the level of the sea, in which sand does not occupy more than one-fifth of the entire area, and where large chains of mountains are found attaining a height of from about 6550 feet to 8200 feet. In some parts it only rains once in some twenty years, while in others there is a regular rainy season; the temperature there rises to 122° F. and falls to 19·4° F.; and the loftiest mountain tops are covered with snow and ice for several months in the year. The flora and fauna have a special importance. Lastly, the Sahara has a population of some 3,000,000 and contains towns with from 5000 to 10,000 inhabitants. According to Signor Cora, the Sahara has a total area of nearly 3,700,000 square miles, stretching on the north to the Great Atlas and the Mediterranean, between the two Syrtes to the south of Cyrenaica and Lower Egypt; on the east it is conterminous with the valley of the Nile; on the south it is bounded by a line running from El Obeid to Lake Chad, to the middle course of the Niger, and the lower part of the Senegal; and lastly, on the west it reaches the Atlantic Ocean. After having said a few words respecting the principal journeys accomplished of late years, Signor Cora described the various zones of the Sahara, the zone of sand-dunes, that of the lofty plateaux, and finally the mountainous zone. He afterwards dealt with the hydrographic systems of the Sahara, and concluded by expressing a hope that some Italian traveller might be induced to follow the example of Barth, Rohlf, Nachtigal, Duveyrier, Lenz, and others, and devote himself to the study of the Sahara, and bring back with him fresh scientific information.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Baddeley, M. J. B.—The Peak District of Derbyshire and Neighbouring Counties. London (Dulau): 1882, 12mo., pp. xxiv. and 138, maps. Price 2s. 6d.

The little volumes by the same writer on the English lakes and the Highlands (forming part of the 'Thorough Guide Series') have already been commended for the prominence given in them to physical characteristics. The present one lacks the coloured ranges of elevation on its maps (1 general and 4 sectional), as the Ordnance Survey, from which they are adapted, has not yet been executed on the contour system for the county.

Baedeker, K.—The Rhine, from Rotterdam to Constance. Handbook for Travelers. 8th remodelled edition. Leipsic (Baedeker) and London (Dulau): 1882, 12mo., pp. xxxiv. and 388, maps, plans. Price 6s.

Corresponds with the 21st edition in German and the 12th in French, and is materially larger than its predecessors, containing amongst other additions an article on Rhenish Art by Prof. Springer of Leipsic.

Curtius, E., und Adler, F.—Olympia und Umgegend. Zwei Karten und ein Situationsplan gezeichnet von Kaupert und Dörpfeld. Berlin (Weidmannsche Buchhandlung): 1882, 8vo., pp. 48, maps and plan. (*Williams & Norgate*: price 4s.)

The excavations of Olympia in the Peloponnesus, commenced in 1875, were brought to an end in March 1881, and the account of the daily work upon them has also been concluded with its 5th volume. A second publication has been commenced for the systematic description of the artistic and scientific results, and the learned authors have judged it advisable also to issue the maps and plan referred to in the title, with some explanatory text, to assist the general reader. The first of these maps (scale 1 : 100,000) gives the site of the buried city and the entire surrounding district, showing in colours both ancient and modern topographical names, elevations, river-plains, distribution of forest and hills, &c.: the second one gives the city and its immediate neighbourhood on a larger scale (1 : 12,500), and with the addition of contour lines. The plan (scale 1 : 1500) shows the sites of the various buildings, &c., excavated, at the end of the operations.

Denis, A.—Hyères, ancien et moderne. Promenades pittoresques, scientifiques et littéraires sur son Territoire, ses Environs et ses Îles. Quatrième édition . . . par R. Chassinat. Hyères (Souchon): n.d., pp. 672 and xii., map, plan, and frontispiece. (*Dulaud*: price 6s.)

A much increased and practically rewritten form of the old descriptive work, of which the first edition appeared about 1835. The history both ancient and modern is discussed at considerable length, both by epochs and localities; as also are the points of social and administrative economy. In a 3rd part, the archæology, geology and mineralogy, botany, zoology, meteorology, and hygienic and medical climatology receive special attention. Lists of plants and insects, tables of temperatures, &c., and an arranged bibliographical index are given, with a plan of Hyères and a map of it and its environs.

Gibraltar.—A popular History of Gibraltar, its Institutions, and its Neighbourhood on both sides of the Straits, and a Guide Book to their principal places and objects of interest. Compiled by Major Gilbard, Garrison Librarian. Gibraltar (Garrison Library Printing Establishment): January, 1882, sm. squ. 8vo., pp. 160, maps. Price 15 rvn. (2s. 6d.).

The title sufficiently indicates the nature of this useful little book, which contains information of all kinds, historical, scientific, and topographical, bearing on the rock of Calpe. The map is on the scale of 5½ inches to the English statute mile.

Lanfranconi, Enea.—Rettung Ungarns vor Ueberschwemmungen. Budapest (Moritz Ráth) & Wien (Lehmann & Wentzel): 1882, sm. fo., pp. 84, 2 maps separate.

The author discusses former attempts to regulate the waters of the Theiss, after some general observations, in which the importance of physical geography as regards engineering operations of this extent is fully recognised; and concludes with elaborate hydrographic data which have served as a base in the construction of his longitudinal section of the Hungarian Danube. This section, and a map (scale 1 : 144,000) of the area of inundation of the Danube and its affluents in Lower Hungary, on which is also a smaller map of the corresponding area in the whole of Hungary, accompany the work.

In connection with this work, may be here mentioned its recent predecessor, received from the author, on the means of communication by water in Central Europe and the regulation of the Danube, especially the part between Theben and Gönyö. The text of this, in Freuch (Vienna: 1881, sm. fo.), Magyar and German (Pressburg: 1880, oblong 4to.), is accompanied by large folio maps. In this work (of which the primary Magyar title is as follows:—'Közép-Európa Viziutai és a Duna-folyam Szabályozásának Fontosságáról'), the general question of Central European waterways, natural and artificial, is dis-

cussed in connection with the author's gigantic project of regulating the flow of the Danube, his final aim being to join that river with the Rhine, the Oder, and the Elbe, and his immediate special object the rectification of the passage between Theben and Gönyö. The treatment of the major point (which is illustrated by a map, scale 1:4,000,000) cannot be accepted as more than superficial, compared for instance with Von Weber's work, 'Die Wasserstrassen Nord-Europas,' recently noticed in our 'Proceedings,' and of which it would from the title alone form an appropriate continuation. But considerable detail (more of engineering than geographical importance) is given on the important question of the Danube navigation, on which Major von Vilovo, General Türr, and others have written of late years; and this part is illustrated by maps, one (in 2 sheets) of the usual seat of inundations of the Danube and its affluents (scale 1:144,000), the other of the district between Theben and Gönyö (scale 1:20,000), with profile on the same scale; a section is also given of the river in various places (scale 1:100), with a working sketch plan of the inundation locality (scale 1:200,000), and a table of water heights at Pressburg from 1850 to 1879.

ASIA.

[**Eastwick, E. B.**].—Handbook of the Bengal Presidency, with an account of Calcutta City. London (John Murray): 1882, cr. 8vo., pp. viii. & 396, maps. Price 20s.

The first Handbook of the Presidency as a whole, including also routes to the chief places in Oudh, Rohilkand, the North-West Provinces, and Burma. Three maps are given, of Bengal and Assam, the North-West Provinces and Oudh, and British Burma (scale 55 miles to the inch). There is also a plan of Calcutta ($\frac{1}{8}$ mile to the inch).

Floyer, Ernest Ayscoghe.—Unexplored Balūchistan. A Survey, with Observations, astronomical, geographical, botanical, &c., of a Route through Mekran, Bashkurd, Persia, Kurdistan, and Turkey. London (Griffith and Farran): 1882, 8vo., pp. xvii. and 507, map, plates. Price 11. 8s.

Sir Frederic Goldsmid, in some introductory observations to this volume, sufficiently indicates its geographical and political importance. Mr. Floyer's journey, indeed, is a practical exposition of the opinion formed by Sir Frederic himself and communicated by him some years ago to the Government, viz. that the employés of the Indo-European Telegraph stationed on the Persian Gulf should be encouraged and assisted in carrying out volunteer expeditions into the interior. This idea did not receive official sanction, but Mr. Floyer in 1876, at his own expense, carried out an expedition on being granted his privilege leave after some years' hard service. His book contains the record and results of three separate journeys: the first with camels and Balūchi attendants through Mekran to Bint and Bampur; the second (of slight importance) to the islands of Henjām and Kishm, in the strait of Hormuz, then to Bander Abbas and Minab on the mainland, across the Persian Gulf to Bahrein, and finally to Bushire; the third, with camels and Balūchis, through Bashakard north to Kahnu and Kirman (during which he visited the fierce Balūch chief Seif Allah Khan in his stronghold of Anguhran), continuing with Persian attendants, mules, and horses, through Yezd and Ispahan to the Turkish frontier at Khanikin, thence to Baghdad and Basreh, and home to England via Marseilles.

Mr. Floyer's general deductions upon the Bashakard Balūchis have already been briefly published in the Report of the Proceedings of Section E at the British Association Meeting for 1877 at Plymouth, but this volume not only gives his experiences of the people in considerable detail, but contains a large amount of new material. From the first journey, which almost immediately penetrates regions marked as unexplored in Major St. John's map, besides the addition of various names, both of districts and villages, some important geographical corrections and acquisitions result,—nearly all the names below mentioned representing additions to our knowledge. Travelling eastward from Jask parallel with the telegraph line on the Mekran coast, Mr. Floyer, on arriving at Kashi, struck northwards for Bint, which he reached after crossing

the rivers Kashi, Karwan, Tenk, Gidich, Pazga, Hadar, Bint, and Zangutan. Bint itself was found to be over 50 miles to the N.N.W. of its reputed position, and the next town, Fanoeh, is in the like direction over 60 miles out of place;—the final aim of this journey, Bampur, being 70 miles north of its supposed locality, and situated (as is Kasimabad) on the south and not the north side of the river). Many hills and ranges were noted; the snow-covered Bazman range sharing the further northward extension of Bampur, and a new range, the Band-i-Nilag, about 3500 feet, stretching north-west of Fanoeh in the direction of a new range, the Band-i-Marz, north of the 27th parallel. On the return to Jask, the upper course of the Sadaich was followed and crossed, and the mountain Gou Koh (8400 feet) placed a little further to the north; the Kûh-i-Luh, under the name of Guarani hills, being more accurately and continuously defined.

After the excursion up the Gulf, the more important journey through Bashakard into Persia proper, also for a considerable part of its earlier portion in unexplored districts, produced various geographical and topographical results of interest. Passing through Geigen and Oushdahndarri, and crossing the Sharifi and the alluvial plain of the Pizgh country, a mountain, Zangiak, is laid down on the left, and a range, the Aphen-i-Band (3600 feet), on the right, of the northward track; and an excursion to the north-east, in the Daroser country, resulted in the discovery of a large river, the Pahtik, in a bifurcation of which is situated Anguhran, close to the 58th degree, some 40 miles W.N.W. of its conjectural locality according to Major St. John. Anguhran (the old Angoran) represented at the time of Mr. Floyer's journey the capital of Bashakard, and it was therefore highly important that its correct position should be defined. As a fact, it is simply a huge fort, on which recent attacks have made slight impression. Mount Rashtu and a river, Shahr Baghi, were also added to the map. Resuming the northward road through Jangda, the rivers Gaz Shirai and Dharman, Mount Barahing, and various villages were met with, and soon after passing Minab (some 15 miles distant on the west) a rich plain, with the Ginou Mountains on the right and Garaki hills on the left, was traversed, before reaching Kahnû. Thence through Rudbar and Jiruft, the road crossed the Haliri river, leaving the Isfanaka hills on the west, and the great Jamal Bariz range was reached, its axis being found to run in a more east and west direction than hitherto supposed, and to be probably continuous with the Bazman range above mentioned. About 50 miles off, a new range, the Darzin, is shown, forming the north-eastern boundary of the smooth and barren sandy valley of Bam. Various positions hereabouts are corrected; thus Tahrut and its hill are moved 10 miles to the east, and the course of its river is altered; and on the western side of the route Mount Raiun and Mount Jupar (13,000 feet) are shown before reaching Kirman. Striking from Kirman north-west to Yezd, through shingly desert and bleak undulating plains with barren hills on either side, various positions are slightly shifted, some to the north and others to the west (including Yezd itself), and west of Anar twin conical peaks, called Arj (or "citadel") are shown. Yezd, like the ancient ruined city of the same name a few miles further north, is believed to be slowly undergoing the process of sand-burial. The few corrections on the road from it to Ispahan are chiefly to the east and north, as are those from that city to the Turkish frontier; and north of Ispahan a huge snowy range is indicated, probably continuous with the Koh Nogat, forming the north-eastern wall of the Yezd plateau. The addition to the map of so large a town as Dowletabad (the Dâulatâbad of Ferrier and of Goldsmid's 'Eastern Persia,' since the publication of which work it must have wonderfully progressed) is important: it now contains a public square, telegraph office, bazaar, and other evidences of civilisation, and is the starting place for caravans to Shuster and Dizful, which form the half-way house for trade between Basreh, via the Karûn river and Ispahan, and Hamadan (being situated 45 miles south-east of the latter town). Most European goods come from the north via Tabriz, and not by this shorter route, which is more difficult, and which Mr. Floyer was prevented from exploring, in spite of determined efforts.

The incidental observations on a route which discloses such important

corrections and additions as those above mentioned are naturally of considerable interest. Mr. Floyer's chief attention, next to fixing positions, keeping his dead reckoning, and taking altitudes and temperatures, was paid to botanical and ethnological matters, but his notes contain information on various other points, especially as to the nature of the country traversed, its productive capability or otherwise, and local politics. Thus he describes a common formation in the Bashakard country and Mekran of salt mud-hills called Shûr (misprinted "Rush" in the Index and on a plate), often suddenly occurring, forming a high sharp-edged ridge, whitish blue in tone and of nodulose appearance, with veins of gypsum; also the structure of Balûch burying-grounds, consisting of rectangular brick buildings with peaked corners on high mounds; the general use for many purposes of the "pish" or fan palm (*Chamerops*); the fact of locusts being driven to cannibalism; the existence of a belief in demons called "hirsch," traditionally supposed to be of partially human origin (discovered to be bears!), &c. His notes on roads and camels will also be of use to future travellers; in Mekran, at all events, the former seem to be watercourses or torrent-bed passes, varied with quicksands; the plain camels are of little or no use for the elevated plateau; and to the danger of poisoning from oleander is added that of the salt grass called "odalik" (*Caroxylon*), which is often fatal to these animals.

Among the notes on Persia proper, is one on the cultivation of opium, commenced at Yezd, and now spreading largely in area and increasing in amount yearly: as many as 18,000 lbs. were stated to be annually produced at Râin, and any considerable increase of the national wealth will probably, in the author's opinion, arise from this source.

Various scientific Appendices are added to the work. In the first, observations are made on some dialects of Western Balûchistan and others akin to them, with a vocabulary of 8 or 9 pages. Nearly all the undesignated words of Mekran Balûchi in Pierce's excellent vocabulary were found by Mr. Floyer in common use in the north on his journey into Kurdistan. In the second are the names and localities of the plants collected (determined at Kew). The third Appendix is especially geographical, and contains an account of the instruments employed, the astronomical observations and method of reduction, table of concluded latitudes and longitudes (47 positions), and some conjectures on the unknown course of the Haliri and Bampur rivers. The author (p. 263) records the idea that they unite to form the Sadaich, as two such streams could not be lost in the sand near each other without producing an immense area of fertile swampy country. The Haliri, where he crossed it above Kahnû, was 30 yards wide and with an average depth of $4\frac{1}{2}$ feet. There are two other alternatives for the united streams, (1) that they may choose either of the two huge torrent beds meeting at Anguhran and go to Jagû; or (2) that they may form the western tributary of the Biot river, and come down with it. The third Appendix contains lengthy meteorological tables.

The map (scale 1:2,520,000) shows the whole of Southern Persia, with horizontal section of the author's route from Jask to Baghdad.

Liebscher, Georg.—Japan's landwirthschaftliche und allgemeinwirthschaftliche Verhältnisse. Jena (Fischer): 1882, 8vo., pp. viii. and 184, maps. (*Williams & Norgate*: price 5s.)

A special analysis of the physical constitution of Japan, as influencing agriculture and trade, discussing:—(1) Climatic conditions and their bearing upon soil-products; (2) the influence of the surface geology on these products; (3) agricultural conditions before 1868; (4) the revolutions in the State organisation since that date; (5) the foreign trade relations. Tables of the latter from 1868 to 1880 are given; the maps show the general geographical and political features of the south islands, with the districts of cultivation of *Hordeum nudum*, sugarcane, and wax and lacquer trees (*Rhus*), in 1877, and of rice-fields in 1878.

McCrindle, J. W.—Ancient India, as described by Ktésias the Knidian; being a Translation of the Abridgment of his "Indika" by Phôtios, and of the fragments of that work preserved by other writers. Calcutta (Thacker, Spink, & Co.), Bombay (B. E. S. Press), and London (Trübner): 1882, 8vo., pp. viii. and 104.

This volume, reprinted with additions from the 'Indian Antiquary,' of 1881, forms the third of a series of annotated translations of works of classical writers relating to ancient India, on which the author is still engaged, and which will be found of invaluable service to all interested in the early Asian geography and history. The volumes already published are 'Ancient India, as described by Megasthenes and Arrian; being a translation of the fragments of the Indika of Megasthenes collected by Dr. Schwanbeck, and of the first part of the Indika of Arrian,' 1877, and 'The Commerce and Navigation of the Erythraean Sea; being a translation of the Periplus Maris Erythraei, and of Arrian's account of the Voyage of Nearkhos,' 1879; and it is intended in like manner to render the geography of India as given by Strabo and Ptolemy, and the accounts by Arrian and Curtius of the Macedonian invasion.

In the introduction to the present volume, the life and writings of Ctesias are briefly sketched, and Mr. McCrindle points out the under-stratum of elements of truth in many of his accounts hitherto condemned as pure falsehoods. To the translation of the abridgment by Photius and fragments from Arrian, Strabo, Elian, Pliny, Aristotle, Pausanias, and other writers who refer to Ctesias, are added another of Lassen's exhaustive review (1874), and an appendix on certain Indian animals from the work 'De Mundo' by Kosmas Indikopleustes, a monkish traveller of the 7th century.

AFRICA.

Wahl, Maurice.—*L'Algérie*. Paris (Germer, Baillière & Cie.): 1882, sm. 8vo., pp. 344. (*Dulau*: price 3s. 9d.)

The Physical Geography, history, people, politics, and productive force of the country are in turn discussed.

AMERICA.

Elliott, Henry W.—*A Monograph of the Seal-Islands of Alaska*. Washington (Government Printing Office): 1882, 4to., pp. 176, maps, illustrations.

This treatise is reprinted with additions from the Report of the Fishing Industries of the Tenth Census of the United States, and forms a special Bulletin (No. 176) of the U.S. Commission of Fish and Fisheries. Though primarily of zoological and commercial importance, as describing the geographical distribution, natural history, and economic value of the hair- and fur-seals, sea-lion, and walrus, especially in connection with the Pribylov group, it contains much useful geographical material. An account is given of the discovery of the Pribylov Islands, with a translation by the author in the Appendix of the salient portions of Bishop Innocent Veniaminov's work, 'Zapieska ob Ostrovah Oonahlashkenskaho Otdayla,' published at St. Petersburg in 1840, and believed to be the only Russian treatise on the subject; and the islands themselves are described as to general dimensions and contour, land and scenery, geological structure, climate, vegetation, agriculture and its possibilities, insects (with the curious error of referring to "a large flesh-fly, *Bombylius major*"), land mammals, stock- and poultry-raising, bird-life, aquatic invertebrates, &c. Brief detailed descriptions are given of Otter Island (with profiles), Walrus Island, St. Paul (with profiles), and St. George; and the inhabitants are separately discussed. These Aleuts are now so mixed with Russian, Koloshian, and Kamschadale blood as to represent in one way or another all the known races of man. Original maps (scale 2 miles to the inch), with profiles and positions, are given of the islands of St. George and St. Paul, accompanied by explanatory notes and comments; and many smaller maps on a larger scale of the points and bays, &c., which are used for "rookeries" or breeding grounds by the marine mammals are given in the text, which also contains various drawings and descriptions illustrative of the physical characteristics of the islands. The orthography of Bering's name is discussed.

Nacher, Julius. *Land und Leute in der brasilianischen Provinz Bahia*. Leipzig, (Weigel): [n.d.] small 8vo., pp. 280, illustrations. (*Dulau*: price 5s. 3d.)

Describes the journey from Hamburg, the general physical conditions of the

province of Bahia, and all points connected with commerce and industrial products. Some attention is paid to economic botany. A short bibliography (13 articles only) is given, p. 280.

Olascoaga, Manuel J.—*La Conquête de la Pampa, Recueil des Documents relatifs à la Campagne du Rio Negro, comprend l'Itinéraire suivi par toutes les Colonnes expéditionnaires qui, sous les Ordres du Ministre de la Guerre, Général D. Julio A. Roca, ont occupé le désert et porté la ligne de frontière sur le Rio Negro. Précédé d'une étude topographique par Manuel J. Olascoaga, suivi du Rapport du Général Villegas sur l'expédition à Nahuel-Huapi, et d'une notice sur l'importance des Territoires de la Pampa et du Limay, avec la Carte de la Pampa et des Territoires du Rio Negro. Buenos Aires (Courrier de La Plata): 1881, 8vo., pp. civ. and 307, map.*

The greater part of this volume consists practically of a French translation of the larger Spanish work noticed in our 'Proceedings' for 1881, p. 505. To this is added a Report by General Villegas, the Commander-in-chief of the Expedition to Lake Nahuel-Huapi, from which flows the Limay affluent of the Rio Negro. Apart from the political and military results, this operation resulted in a considerable acquisition of knowledge as regards the triangular region comprised between the Neuquen and Limay, with the Andes as a base. This was found to contain, first, well-watered and richly pastured valleys, of an agreeable temperature, followed by mountains apparently of considerable mineral wealth, and by a sterile zone, to which succeeds another fertile region, reaching to the island of Balcheta, from which point to Epu-Lauquen the country is of the greatest promise for agricultural progress, being subject to continual rain; a third zone of plateaux and small mountains is then reached, picturesque, well watered and timbered, and worthy of being called the garden of the Republic. Some general observations on the flora are made, with more detailed notes of the course and navigability of the rivers Limay, Agrio, Alluminé Collon-Curí or Calapuliche, Caleufú, and Traful, &c.; and in a recapitulation of the results of the campaign it is considered that any troubles from the Indians are no longer possible, as they have been driven into the mountain fastnesses of Chili, where horse-rearing is impossible, and where the animals would, from the nature of the soil, require to be shod, whereas on the Pampas those necessary aids in guerilla warfare are bred with ease, and need no foot-protection. The lakes, physical conditions of surface, luxuriant vegetation, and temperate climate of the Nahuel-Huapi delta are considered to give it especial attractions for colonists from the north of Europe.

The map (scale 1:2,000,000) is practically the same as that given with the folio work, the vocabulary of Indian names being translated into French instead of Spanish, and given separately.

In connection with this expedition may be here mentioned two parts of the "Informe Oficial de la Comisión Científica agregada al Estado Mayor General de la Expedición al Rio Negro (Patagonia), realizada en los Meses de Abril, Mayo, y Junio de 1879, bajo las órdenes del General D. Julio A. Roca," published at Buenos Aires (Ostwald y Martinez) in 1881, fo. The first of these (pp. xxiv. and 169, pls. i.-iv.) contains the zoological results of the Roca Expedition, by Adolfo Doering (for the Vertebrates and Mollusks), Carlos Berg (for the Insects), and F. L. Holmberg (for the Arachnids). Some general observations on the faunistic regions of the territory acquired by the expedition are also given. The 2nd part (pp. 170-295, pls. i.-xii.) discusses the botanical results, by Pablo G. Lorentz and G. Niederlein.

Shipp, Barnard.—*The History of Hernando de Soto and Florida; or, Records of the events of Fifty-six years, from 1512 to 1568. Philadelphia (Lindsay): 1881, 8vo., pp. xii. and 689, maps. (Quaritch: price 1l. 4s.)*

An arrangement of the different accounts of events in Spanish America since the discovery of Florida by Juan Ponce de Leon in 1512, so as to form a continuous history of that country in its earliest days. The 'Conquest of

Florida' by Garcilasso de la Vega is given complete. The maps are (1) a copy of that by Jacob le Moynes de Morgues who accompanied Laudonnière to Florida in 1564, and (2) a part of Louisiana from the map of North America by Dr. Mitchell, corrected in 1776 by Brigadier Hawkins, which shows the localities visited by De Soto and his followers. An Appendix contains various notes of historical and geographical interest.

ARCTIC.

Nordenskiöld, A. E.—Vega-Expeditionens Vetenskapliga Iakttagelser bearbetade af deltagare i Resan och andra Forskare. Vol. I. Stockholm (F. & G. Beijer's Förlag): 1882, large 8vo., pp. 812, maps, plates, and woodcuts. (*Dulau*: price 18s.)

The narrative of the actual voyage of the *Vega* by Baron Nordenskiöld, and its popular abridgment by Lieutenant Hovgaard, have recently been noticed in this Bibliography; the former of these accounts contained also some of the immediately recognised and most important points of the scientific results of that remarkable expedition, to the commencement of the details of which the present volume is devoted. It contains the following papers:—Reports during the expedition sent to Mr. Oscar Dickson, a discussion on the possibilities of navigating the Siberian Ice Sea, and of the auroral phenomena observed during the wintering, in Bering's Strait, 1878–79, by Baron Nordenskiöld; the hygienic aspects of the voyage, studies of the sense of colour possessed by the Chukches, and observations on the lichen-flora of the north coast of Siberia, by E. Almquist; the first part of a discussion of the sea-weeds of the Siberian arctic waters, vegetable life on the Siberian north coast, and its phanerogamic flora, a study of plant-geography based on the phanerogamic flora of Novaya Zemlya and the Waigats, the economic plants of the Chukches, and the phanerogamic plants of the Asiatic coast of Bering's Strait, by F. R. Kjellman; on phanerogamic plants from Novaya Zemlya, the Waigats and Chabarova, by Kjellman and A. N. Lundström; a Chukche vocabulary, by O. Nordquist; on the geographical positions (34) fixed during the expedition, by A. Lindhagen; meteorological observations from North Cape to Yokohama, with elaborate tables, by H. H. Hildebrandsson; and a preliminary discussion of the invertebrate fauna of the Siberian arctic seas, by A. Stuxberg, mostly the results of dredging operations.

The maps give the Siberian route of the expedition, Port Dickson, Cape Volgan, Malygin Sound, Cape Chelyuskin, Taimur Sound, and Actinia Bay, as in the Narrative; there is also a coloured circumpolar chart illustrating the auroral paper, and two others giving localities for the botanical and zoological observations, with 3 temperature and barometric diagrams, and some botanical plates.

AUSTRALASIA.

Quirós, Pedro Fernandez de.—Historia del Descubrimiento de las Regiones Australes hecho por el General Pedro Fernandez de Quirós, publicada por Don Justo Zaragoza. Tomo iii. Madrid (Hernandez): 1882, sm. 8vo., pp. 158, maps. (*Dulau*: price 3s.)

This volume (the 6th of the Biblioteca Hispano-Ultramarina) concludes the account of the Voyages of Quirós, and consists of two Appendices, one containing geographical data on the places mentioned in the two preceding volumes (1876 and 1880), the other biographical information on the various personages named in them, both alphabetically arranged. It is also accompanied by maps representing the Solomon Islands and Santa Cruz, discovered by Alvaro de Mendaña in 1568 and 1595, the island of Espíritu Santo, New Hebrides, discovered by Quirós in 1606, the routes of Mendaña and Quirós during their three voyages of discovery in the Pacific, a tracing of an anonymous map in the possession of Sr. Coello, showing the discoveries of Quirós, and a reproduction of pl. 1, vol. iv. of the Boletín of the Madrid Geographical Society, showing various bays, &c., discovered in 1606, connected with the work of Quirós.

GENERAL.

Ratzel, Friedrich.—*Anthropo-Geographie, oder Grundzüge der Anwendung der Erdkunde auf die Geschichte.* Stuttgart (Engelhorn): 1882, sm. 8vo., pp. xviii. nd 506. (*Dulau*: price 9s.)

The first of a proposed series of geographical handbooks under the editorship of Professor Ratzel, of Munich, to be continued at half-yearly intervals in the following order:—General Geography, by Dr. von Fritsch; Oceanography, by Dr. von Boguslawski; the Geographical Distribution of Animals, by Dr. von Graff; Climatology, by Dr. Hann; Glaciers, by Professor Heim; Volcanoes and Earthquakes, by Dr. von Fritsch; and Plant-geography, by Professor Drude. This commencement discusses the connection between history and geography, especially as regards the influence of natural conditions of the earth's surface upon mankind.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

EUROPE.

Ardagh, Major J. C., R.E., C.B.—*Carte de la Nouvelle Frontière Turco-Grecque à l'échelle de 1:50,000 or 1·4 inches to a geographical mile, exécutée pour la Commission de Délimitation par les Commissaires chargés des Travaux Topographiques, sous la direction de M. le Commandant Ardagh.* (Convention signée à Constantinople le 24 Mai, 1881.) Zincographed at the Intelligence Department, War Office, London, 1882. 14 sheets.

Ibañez e Ibañez de Ibero.—*Mapa topográfica de España en escala de 1:50,000 or 1·4 inches to 1 geographical mile.* Comienza su publicacion el Instituto Geográfico y Estadístico Madrid. Part 6, containing sheets: 484 Buitrago, 535 Algete, 605 Aranjuez. (*Dulau*.)

Liebenow, W.—*Special-Karte v. Mittel-Europa nach den neuesten und besten antl. Quellen bearb.* 1:300,000 or 4·1 geographical miles to an inch. Sect. 7. Schawli—9. Kowno—26. Danzig—37. Tempelburg—38. Bromberg—52. Warschau. Hannover, Oppermann. Price 1s. each sheet. (*Dulau*.)

Sonklar, Carl von.—*Regenkarte der oesterreich-ungarischen Monarchie (Vertheilung der Niederschlagshöhen im Jahresmittel), von Carl von Sonklar, k.k. Generalmajor d. R.* Verlag von Ed. Hölzel in Wien. Physikalisch.-statist. Atlas v. Oesterreich-Ungarn No. 4. With letterpress. (*Dulau*.)

Tietze, Dr. E.—*Geologische Karte der Umgebung von Lemberg aufgenommen 1880.* Scale 1:75,000 or 1 geographical mile to an inch. Wien, Hölzer. Price 4s. (*Dulau*.)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st March, 1882.

1-inch—General Maps:—

ENGLAND AND WALES: New Series, sheet 283 (in outline and with contours), price 1s.

IRELAND: sheets 199, 200 (hill-shaded), price 1s. each.

6-inch—County Maps:—

ENGLAND: Cheshire, sheets 7, 9, 16, 22, 33, 55, price 2s. 6d. each.

SCOTLAND:—Islands of Islay and Orsay, &c. (Argyllshire)—Sheet 229, price 2s. Island of Tiree (Argyllshire)—Sheet 78, price 2s. 6d. Hebrides—Harris, &c. (Inverness-shire)—Sheet 14, price 2s. 6d. Hebrides—South Uist (Inverness-shire)—Sheet 48, price 2s. 6d.

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Bremen Geographical Society.—Ost-Kap. Nach Aufnahme der Bremer Expedition unter Gebr. Krause, vom 21 bis 27 Aug. 1881. Scale 1:300,000 or 4·1 geographical miles to an inch. Deutsche Geographische Blätter. Band V. Tafel 8. Geograph. Anst. v. Wagner & Debes, Leipzig. Bremen, Kommissions-Verlag von G. A. v. Halem, 1882. (*Dulau.*)

Doughty, Charles M.—Charles M. Doughty's Reisen zwischen Teimâ, Hâil, Khaibar u. Bereida. Scale 1:3,100,000 or 42·4 geographical miles to an inch. Red. v. Richard Kiepert.

— Hydrographische Skizze des Wadi Dschizzel-el-Humd von Charles M. Doughty. R. Kiepert red. Berlin.

— Skizze der Thalebene von el-Hedscher. Die Pilgerstrasse (Derb el-Hadsch) von Kela'at-Katrân bis Medjin Salih. Von Charles M. Doughty. Vulkanische Zone zwischen Tebûk und Mekka. Globus, Bd. XXXIX., No. 1. Verlag von G. Vieweg u. Sohn, Berlin. 3 Maps on 1 sheet. (*Dulau.*)

Garceau.—Golfe du Tong-Kin, Crique de Haw-Tui. Croquis levé en 1879. Paris. Price 1s. (*Dulau.*)

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4 inches to 1 mile. On two sheets; size 50 inches by 54. Coorg, Hattugat Government Forest Reserve, Hattugat-nad, Kiggatnad Taluk, 1881. Scale 4 inches to 1 mile; size 50 inches by 46.

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Petermann's 'Geographische Mittheilungen.'—Die russisch-türkische Grenze in Armenien von 1878. Nach den Aufnahmen der internationalen Grenzcom-

mission von Generalmajor Stebnizki 1879 bis 1881. Scale 1 : 1,200,000 or 16·4 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1882, Tafel 7. Justus Perthes, Gotha. (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Karte der Philippinen zur Darstellung der Ethnographischen Verhältnisse, der administrativen Eintheilung und der gegenwärtigen geographischen Kenntniss. Entworfen von Professor F. Blumentritt, bearbeitet und autographirt von B. Domann. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. *Nebenkarte*: Skizze zur Entdeckungsgeschichte der Philippinen. Scale 1 : 10,000,000 or 137 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 67. Justus Perthes, Gotha, 1882. (*Dulau.*)

— W. Oschanin's Expedition in Buchara, Karategin, und in der nord-westlichen Pamir im Jahre 1878. Reduction der Routenaufnahme durch den Topographen der Expedition Stabs capitain G. E. Rodionow, sowie derjenigen des Generalstabs oberst Matwejew. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. *Nebenkarte*: Übersichtsskizze zu den Expeditionen von W. Oschanin 1878 und Hofrath A. Regel 1881. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 9. (*Dulau.*)

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Sachau, Professor E.—Sitzung der Ges. f. Erdk. zu Berlin vom 4 März 1882. (Vortrag d. Prf. E. Sachau). Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Red. v. Richard Kiepert. D. Reimer, Berlin, 1882. (*Dulau.*)

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AFRICA.

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This map shows the routes followed by Herr Dahse in his journeys between the years 1864 and 1881, and the positions of the different concessions to European gold-mining companies.

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Petermann's 'Geographische Mittheilungen.'—E. Marno's Aufnahme des Bahr-el-Ghasal im ägyptischen Dampfer "Bordén," Januar und März bis Juni 1880. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1882, Taf. 6. Justus Perthes, Gotha. (*Dulau.*)

AMERICA AND WEST INDIES.

Chavanne, Dr. Joseph.—Central-Amerika und Westindien, entworfen und gezeichnet von Dr. Joseph Chavanne. Scale 1 : 6,500,000 or 89 geographical miles to an inch. A. Hartleben's Verlag in Wien, Pest u. Leipzig, 1882. Price 4s. (*Dulau.*)

This is one of the series of maps by Dr. Joseph Chavanne, of which "Karte von Central-Afrika," and "Karte von Central-Asien," have already been published. The map is well executed, and the colours well chosen; all railways and submarine telegraphs are laid down, and there are, in addition, four inset maps showing on an enlarged scale: the Isthmus of Tehuantepec with the projected canal, the Plateau of Mexico, the Isthmus of Panama with the canal as proposed by M. Lesseps, and the Isthmus of Darien and the proposed canal between the Atrato river and the Gulf of San Miguel.

De las Peñas, D. German G.—Gran carta geografico-enciclopédica de la Isla de Cuba dedicada a sus Diputaciones provinciales, editada por 'La Propaganda Literaria' de la Habana en 1881. Price 2l. (*Dulau.*)

Johnston, W. & A. K.—A new map of the Province of Manitoba, within its extended limits. Scale 1 : 1,458,000 or 19·9 geographical miles to an inch. W. & A. K. Johnston, Edinburgh and London, 1882. Price 1s.

This map has been constructed from the most recent Government Surveys, and other reliable material, and shows the Administrative Divisions of the country into Land Districts, Counties, and Townships; the course of the Canadian-Pacific Railway—in operation and constructing—with its branch lines, and the various projected Railways are accurately laid down; the Land Offices and all Post Offices are inserted, and the Indian Reservations are indicated.

Rand, McNally, & Co.—New enlarged scale Railroad and County Map of Texas, showing every Railroad Station and Post Office in the State. Scale 1 : 1,500,000 or 20·4 geographical miles to an inch. Rand, McNally, & Co., Chicago, 1882. (*Trübner.*)

This is one of a series of railway maps in course of publication by Rand, McNally, & Co., of Chicago; it folds into a convenient size, and is accompanied by a new and original index designating all the post-office towns and railway stations. The accompanying letterpress contains a postal guide, giving full directions for sending letters to every place, not a post office, in the State, known in the Post Office Department as "Locals"; there is also an alphabetically arranged list of all the railroads in the State, with the name of the express company doing business over each. County boundaries, lakes, and rivers are clearly laid down.

— Indexed Map of British Columbia, showing the Creeks, Islands, Lakes, Mountains, Rivers, and Towns, carefully indexed, referring to the exact location where each may be found on the Map. Rand, McNally, & Co., Chicago, 1882. (*Stanford.*)

Schreiner, L.—Plana da Cidade de Sn. Sebastião do Rio de Janeiro. L. Schreiner, Rio Janeiro. Scale 1 : 10,000 or 7·3 inches to a geographical mile. Price 10s. 6d. (*Dulau.*)

Symons, Lieut. Thomas W.—Map of the Department of the Columbia, projected and compiled at the Engineer Office, Department of the Columbia, by Lieut. Thomas W. Symons, Corps of Engineers, assisted by Alfred Downing and C. C. Manning, Topographical Assistants, U.S. Army. Drawn by Alfred Downing. Prepared and published under the direction of Brig. Gen. H. G. Wright, Chief of Engineers, U.S. Army, 1881. Scale 1 : 1,020,000 or 13·9 geographical miles to an inch.

This is a very well executed map, and contains a large amount of information not to be obtained elsewhere; all railroads, projected and in operation, are laid

down, waggon roads and trails are clearly indicated, together with the military stations. This map cannot fail to be of great service to all travellers who visit the Department of the Columbia, as it contains more information than has ever before been given on a sufficiently large scale to be useful.

Wheeler, Lieut. Geo. M., U.S.A.—Topographical Map of Lake Tahoe Region, Sierra Nevada, California and Nevada. Scale 1 : 84,480 or 1·5 geographical miles to an inch. U.S. Geographical Surveys West of the 100th Meridian. U.S. Expeditions of 1876 and 1877 under the command of 1st Lieut. Geo. M. Wheeler, Corps of Engineers U.S. Army. By order of the Hon. the Secretary of War, under the direction of Brig. Gen. H. G. Wright, Chief of Engineers, U.S. Army.

Ziegler, Dr. J. M.—Karte der Vereinigten Staaten v. Nord-Amerika, nebst Mexico, Central America und Westindien. Gezeichnet von Th. v. Bomsdorff. Scale: 7,000,000 or 95·8 geographical miles to an inch. Four sheets. New edition. 1882. Hinrichs, Leipzig. Price 4s. (*Dulau.*)

OCEANIA.

Petermann's 'Geographische Mittheilungen.'—Die Viti oder Fiji-inseln. Hauptsächlich nach den Aufnahmen der englischen Admiralität bis 1881. Sowie nach den Forschungen von John Horne, 1877-78, u.A., bearbeitet & autographirt von B. Domann. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1882, Tafel 8. Justus Perthes, Gotha. (*Dulau.*)

CHARTS.

Dépôt des Cartes et Plans de la Marine.—No. 3837. Mer de Chine. Côte Este de Cochinchine. Du Cap Varella a l'Île Buffle. 1881.—3845. Mer de Chine. Côte Est de Cochinchine. Baie de Camraigne. 1881.—3852. Mer de Chine. Golfe de Siam. Îles Poulo Dama. 1881.—3841. Mer de Chine. Côte Est de Cochinchine. Ports de Xuanday. Vung-Lam et Vung-Chao. 1882.—3829. Mer de Chine. Côte Est de Cochinchine. Environs de Vung Moë. 1881.—3860. Golfe de Siam. Île de Phu-Quoc. Côte Sud. Baie de Bay Cáy Dũa (Baie du Cocotier). 1881.—3831. Golfe du Tonquin. Groupe des Îles Hòn Me (en Chinois Sa-pat-máa). 1881.—3830. Océan Pacifique Sud. Île Uvea. Baies de Mua et de Mata Utui. 1881.—3823. Tahiti. Côte Est de Mahaena à Faone, 1881.—3806. Nouvelle Calédonie. Côte Ouest. Partie comprise entre Uïtoe et Uarai. 1880.—3826. Nouvelle Calédonie. Île Pott et Partie Nord de l'Île Art. 1881.—3673. Océan Pacifique. Îles Marquises. 1878.—3817. Océan Pacifique Sud. Îles Souwaroff. Croquis de l'entrée du Lagon. 1881. Dépôt des Cartes et Plans de la Marine, Paris.

ATLASES.

Bevan, G. Phillips, F.S.S., F.G.S., &c.—The Statistical Atlas of England, Scotland, and Ireland, edited by G. Phillips Bevan, F.S.S., F.G.S., &c. Complete in fifteen parts, each containing three coloured maps and letterpress. Part XV. Population, W. & A. K. Johnston, Edinburgh and London, 1882. Price 7s. 6d. each part.

This part completes the "Statistical Atlas," the publication of which commenced in January 1881. The following subjects have been treated upon:— I. Religious. II. Educational. III. Industrial. IV. Criminal. V. Poor-Law and Pauperism. VI. Marine (Commercial). VII. Agricultural. VIII. Military and Naval. IX. Legal. X. Railway and Telegraph. XI. Sanitary. XII. Geological and Mining. XIII. Hydrographical (Water Supply). XIV. Political. XV. Population. In addition to the statistical maps, there is much valuable information on the several subjects, in the letterpress which each number contains.

Gaebler, E.—Special-Atlas der berühmtesten und besuchtesten Gegenden und Städte Deutschlands und der Alpen. Scale 1 : 125,000 or 1·7 geographical miles to an inch. 100 Karten. To be published in 25 parts at 1s. each. (*Dulau.*)

Mello, Barão Homem de.—Atlas do Imperio do Brazil, segundo os dados officiaes existentes e outros documentos fornecidos pelo Ex. Sr. Conselheiro Barao Homem de Mello e Tenente Coronel de Engenheiros Francisco Antonio Pimenta Bueno e pelos mesmos revisto. Organizado e gravado por Claudio Lomellino de Carvalho. Editado por Angelo Agostini e Paulo Robin. Rio de Janeiro, 1882.

This atlas, which contains 23 maps, appears to be a revised and corrected copy, on a reduced scale, of that published by Snr. Senador Candido Mendes de Almeida; it however contains much additional information with regard to the topographical details in the vicinity of the lines of railway. The work is well executed, and the maps are clear and not overcrowded with names. It is a pity that more attention has not been paid to accuracy in the map of the Eastern Hemisphere, given at the beginning of the Atlas.

Stieler, Adolf.—Hand-Atlas über alle Theile der Erde. Neu bearbeitet von Dr. August Petermann, Dr. Hermann Berghaus und Carl Vogel. Parts: 30, 31, 32. Price 2s. each. Justus Perthes, Gotha, 1881. (*Dulau.*)

The contents of these parts of the new edition of Stieler's Hand-Atlas are as follows:—

Part 30: Nr. 27. Oesterreich-Ungarn. Nordwestlicher Theil. Von C. Vogel. 1:1,500,000. *Nebenkarte*: Prag und Umgebung, 1:150,000. Nr. 92. Süd-Amerika in 6 Blättern. Blatt 3. Von A. Petermann. 1:7,500,000. Nr. 95. Süd-Amerika in 6 Blättern. Blatt 6. Von A. Petermann. 1:7,500,000. *Nebenkarten*: Die Rhede von La Guaira, 1:75,000. Puerto Cabello.—Montevideo.—Bahia.—Santa Marta.—Buenos Aires.—Rio de Janeiro. 1:150,000. Der Hafen von Cartagena, 1:300,000. Sabanilla, Baranquilla und die Mündungen des Magdalenen-Stroms, 1:750,000.

Part 31: Nr. 28. Oesterreich-Ungarn. Südwestlicher Theil. Von C. Vogel. 1:1,500,000. *Nebenkarte*: Wien und Umgegend, 1:150,000. No. 67. Ostindische Inseln. Von Dr. Hermann Berghaus. 1:12,500,000. *Nebenkarten*: Java, 1:7,500,000. Die Strassen, 1:1,500,000. Atjih.—Batavia, 1:500,000. Niederlande, 1:12,500,000. Nr. 94. Süd-Amerika in 6 Blättern. Blatt 5. Von A. Petermann. 1:7,500,000. *Nebenkarten*: Valparaiso und Umgebung, 1:150,000. Lima, Callao and Umgebung. 1:300,000. Santiago und Umgebung, 1:750,000.

Part 32. Vorbemerkungen und Inhaltsverzeichniss. Nr. 1. Titelblatt mit 8 *Nebenkarten*, Erdenentwürfe enthaltend. Nr. 66. Chinesisches Reich. 1:12,500,000. *Nebenkarte*: Peking und Umgebung, 1:500,000.

This Atlas, which was commenced in 1879, is now completed.

EDUCATIONAL.

Cuppers, J.—Schulwandkarte von Europa. 12 sheets, lith. and colour. Schwann, Düsseldorf, 1881. Price 10s. (*Dulau.*)

Eck, G. A. van.—Schoolkaart van Nederl. Oost-Indië. Scale 1:300,000 or 4·1 geographical miles to an inch. 8 sheets. Chromolith. Stemler, Amsterdam, 1881. With 32 pages of letterpress. (*Dulau.*)

Friedemann, H.—Schulkarte von Europa. Chromolith. D. esden, Huhle, 1881. (*Dulau.*)

Murby, Thos.—Schoolroom Chart of Geographical Illustrations. Designed by F. Rutley, Esq., H.M. Geol. Survey. Drawn by Walde Sargeant. Printed by W. Griggs. Thos. Murby, London. Mounted on rollers and varnished.

THE MALAY PENINSULA

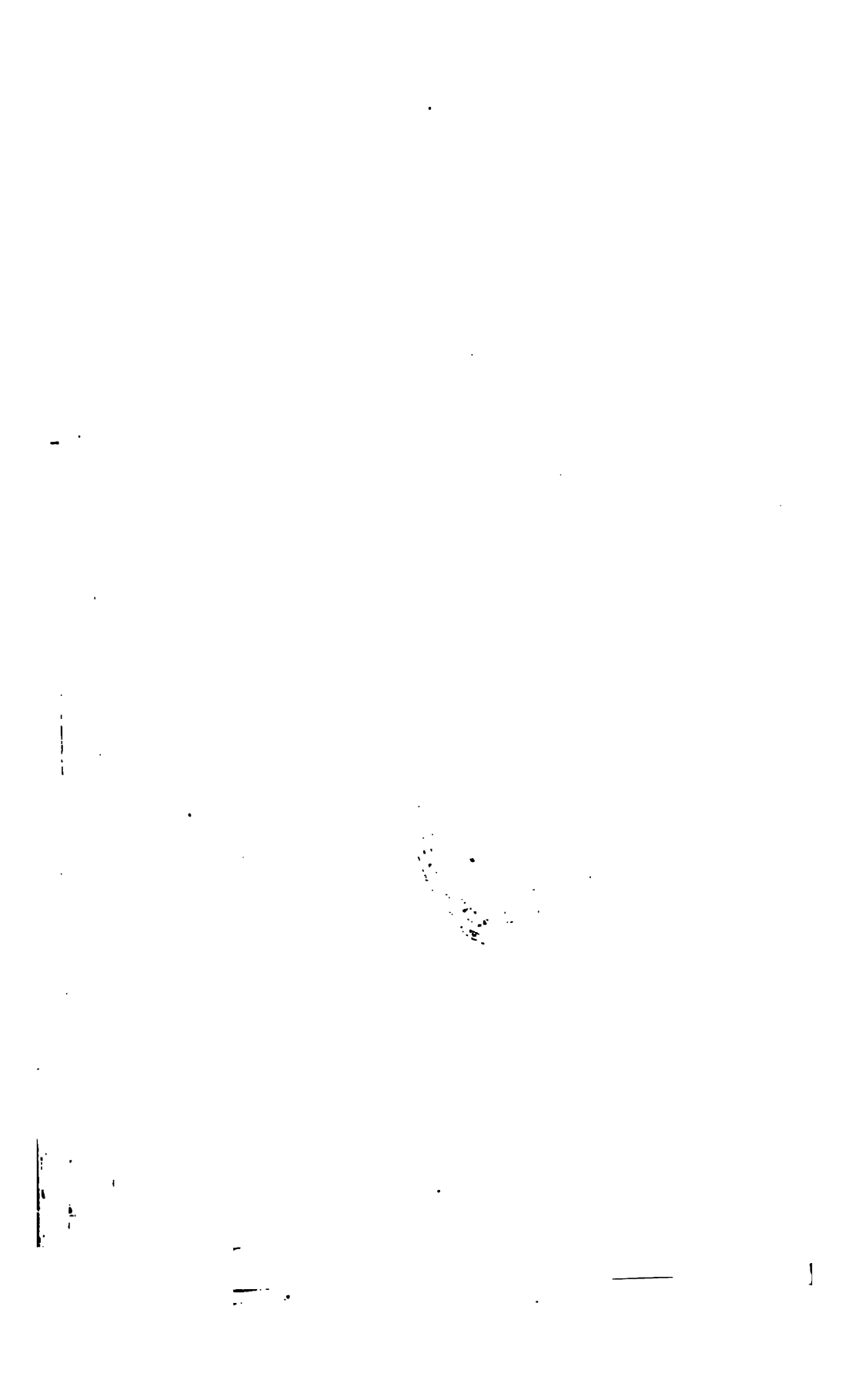
To accompany the paper of Mr. D.D. Daly,
Superintendent of Public Works and Surveys, Sélàngor.
showing his Surveys and Explorations in the Native States.

Natural Scale 1:1,210,000 or 1 inch = 19.2 miles.

Scale of English Miles.



E Weller, Jr.



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MAP OF THE
PART OF PERAK
PENINSULA)

Survey by Mr. D.D. Daly,

1877.

N. Long 100° 54' 15" E. (approx.)

Scale of English Miles.



ABBREVIATIONS.

Hill	Kwala. (Kw.)	Mouth of River
Mountain	Pulo. (P)	Pulo
Rapid	Sungie. (S. or Sic)	River
Village	Ulu. (U.)	Source of River
Long		Point.



PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

On the Geography of the Birthplace and Cradle of the Mahratta Empire. By Sir RICHARD TEMPLE, Bart., G.C.S.I., D.C.L.

(An address delivered at the Evening Meeting, February 13th, 1882.)

Map, p. 520.

THE subject of my address this evening is the Geography of the Birthplace and the Cradle of the Mahratta Empire. This geography is in the first place illustrated by a map, which has been prepared by the Society's draughtsman, Mr. Sharbau: it is further illustrated by a series of pictorial illustrations, prepared by my brother, Lieutenant George Temple, R.N., and enlarged from sketches made by me upon the spot.* Though the subject of my address will be mainly political, still it will not infringe upon the rules of this Society, and it will after all be in a great degree geographical, because its object will be to show you how, owing to the peculiar geographical features of the country, a despised and abject race rose to dominion over what is now the British Empire in the East.

At the time of which I speak, just over two hundred years ago, about the year 1650, that is a hundred years before the battle of Plassy, and two hundred years before the war of the Indian Mutiny, the Mahrattas had been subjected for full five hundred years to the Mahommedans. They were an aboriginal race, of very humble, I may say unprepossessing, aspect; rather short, clumsy, mean-looking little men: they were thoroughly despised by their Mahommedan conquerors, who called them the mountain rats: but the hour came for them to rise, and with the hour came the man, and the leader. And owing to the extraordinary advantages offered them by the country in which they dwelt, they, in a short time, rose victoriously against their foreign rulers the Mahommedans: they first dethroned the Great Mogul in his imperial palace at Delhi; they fought the Afghan and Persian invaders of

* These have been engraved, much reduced, for this report of the lecture, by Mr. Whymper.—Ed.

India; they worried the Portuguese at Goa; they threatened even the early British Governors of Bombay: European embassies visited them in some of the hill forts depicted in our illustrations; they obtained a dominion from Cape Comorin, near Ceylon, right up to the Himalayas. It was their boast that their cavalry watered their horses in the river Cauvery, not far from Ceylon, and as far as the Indus opposite Peshawur. They fought the English in many stand-up fights. They even threatened us to such a degree that we had to build a ditch round Calcutta to defend ourselves from them. You have often heard Calcutta called the City of the Ditch: against whom was that ditch constructed? It was against the Mahrattas. Such, then, was the splendid imperial position obtained in the course of one century by this abject, despised race. And what was the cause of this astonishing success? It was first the martial quality fostered by the mountains, and in the second place the immense military and political advantages offered by the mountain fastnesses and strongholds. Such is the main topic upon which I shall offer you historical, pictorial, and topographical details.

I must first ask you carefully to consider the map. You will observe the western coast with the great city of Bombay. That coast district is called the Konkan. Then you will observe a long line of dark mountains running from north to south: those are the Western Ghauts. To the east of these Western Ghauts you will see the country called the Deccan, the capital of which is the city of Poona. Now I must remind you of the contour and configuration of this remarkable country. Taking it from west to east, you will first observe the coastline; then there is a great wall of mountain, 2000 feet high on the average, rising in its peaks up to 5000 feet. Then from this average altitude of 2000 feet there gradually slopes eastwards the plateau of the Deccan, so that the Konkan being on the level of the sea, there is a wall of mountains, and above that there is the great table-land of the Deccan, 2000 feet above the sea, gradually becoming lower as you proceed eastwards. Then notice exactly the line of the Western Ghauts. I have explained to you their altitude, 2000 feet on the average, rising up to peaks of 5000 feet.

I must ask you to remember these details, because upon such remembrance will depend the interest with which I hope you will follow the stirring scenes I am about to describe. Then the geology is very remarkable. Time does not permit me to explain the various processes of geological denudation which have caused these hills to present the form of a great wall—literally a wall. The wall may be broken; it may be in sections; but, after all, a wall it is, and a wall it will remain, I suppose, to the end of the world. The geological formation is of the Plutonic kind, commonly called trap: in many parts it consists of layers of indurated lava. The importance, politically,

of these mountains is in this wise: first, they nourish a resolute, enduring, daring, I may say audacious spirit among their inhabitants; secondly, they offer strongholds and fastnesses to which these inhabitants can resort whenever they are pressed by an enemy; and thirdly, and perhaps most important, they run between fertile countries. The country to the west, the Konkan, is one of the most fertile parts of India and one of the most densely inhabited. The country to the east, the Deccan, is also highly fertile and populous. Consequently, the men of the hills can make rapid raids for marauding or plundering purposes, just like the eagle swoops from its eyry upon the quarry. After these sudden descents they can rapidly carry off plunder, treasure, and the like, to the hills, and once they are there it is very difficult to approach them. They are, therefore, able readily to establish a predatory power which cannot be extirpated or exterminated. You will perceive what immense political advantages these mountains offer, and how it is that they become truly the cradle of greatness, power, and empire.

This being the physical, topographical, and political character of the hills, I have to remind you that the leader of the Mahrattas and the founder of their empire was Sivaji. I particularly beg you to remember the name in order that you may follow the, I hope, striking stories I have to tell. Recollect that Sivaji flourished a little over two hundred years ago, one hundred years before Clive won the battle of Plassy, two hundred years before the Indian Mutiny, as I have already mentioned. I am anxious to impress these facts well upon your minds, in order that you may follow my narrative.

With this preface, which I hope has not been too long or too tedious, I will ask you to go straight to the pictorial diagrams. The first illustration to which I shall ask your attention (No. 1) is the hill fort of Junnar, where Sivaji was born. I should explain that the hill itself is called Sewnar, but nowadays takes the name of Junnar, from the town which lies at its base. You will see the town in the illustration, on a plain, and you will note rising above it precipitous mountains. You will also see Junnar clearly marked upon the map just behind the main crest of the range. It is the first instance which I have to mention of those peaks of 4000 or 5000 feet which I have already alluded to. You will see what a rugged precipitous place this is, and what a fitting spot it was for a hero to be born in. I must ask you to remember Sivaji's father, Shahji, because I shall have to mention that person hereafter. I must ask you also to remember that Sivaji's mother was a Mahratta lady of remarkable spirit and energy. Presently I shall have to say more about her.

Sivaji's education was, in the modern sense of the term, rather neglected by these parents, that is to say, he was never taught to read and write. Though in after years he became the sovereign of a great kingdom he never could put the sign manual to his decrees. But he

had an education of a different kind, in those days a much more practical education, for he was taught to be a splendid shot with the gun and with the bow; he was a wonderful rider, and he learnt from poetical recitations all about the ancient history and the religion of his country. He used to hear of these things from the recitals of bards and people of that kind who sang before him regarding all the heroes of the Hindoo race. Thus his mind became imbued with lofty notions of Hindoo nationality, and with that spirit of patriotism which urged him to resist the foreign rulers, the Mahommedans. Among his equipments and accoutrements there were three things which I must select for mention, and to which I must beg your particular attention. The first was what is called the

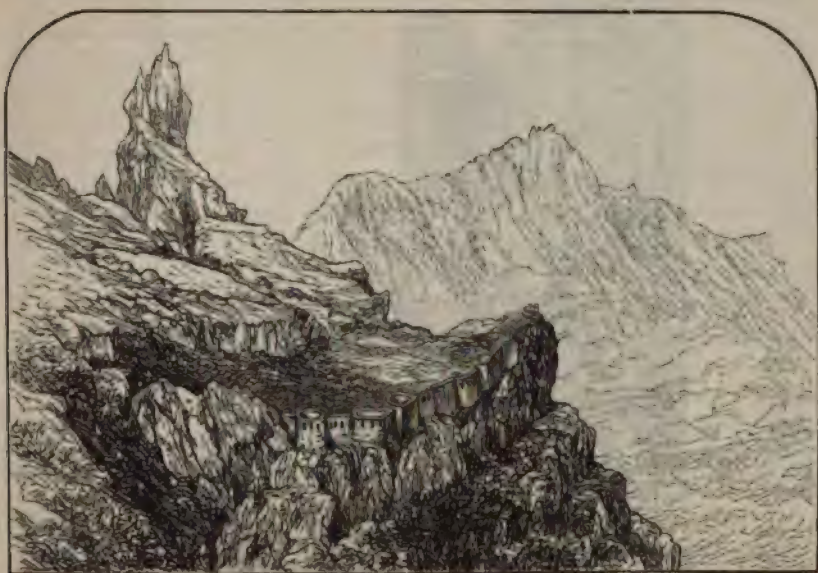


1.—JUNNAR; THE BIRTHPLACE OF SIVAJI.

tiger's claw. The tiger's claw was an iron instrument as near as possible like the claw of a tiger, with very sharp points, which could be fastened inside the palm, so that a man might have the claw in his hand, and yet show the outside, and nobody would suppose there was anything in it. Another thing was his sword, which was called Bhawani, after the name of a Hindoo goddess. It really was a fine Genoa blade. The third article was a coat of mail which he would wear generally under a cotton dress, and in hot weather under a muslin dress; so that he would appear to be a very mild character indeed, though in reality underneath the cotton folds there was this famous sword, which was to the Mahrattas what the sword of King Arthur, "Excalibur," is in Tennyson's poetry, and in his hand there was this

tiger's claw. I must ask you particularly to remember these three articles of equipment.

There were two persons among his attendants whom I must mention. One was the tutor named Dadaji, an old Brahmin, with whom Sivaji was left, when Shahji, the father, went to the wars, and the mother was carried off into captivity by the Mahommedans. Then his tutor and he took a certain house in the city of Poona. I must ask you to remember that house particularly, because you will hear more of it presently. Next, among his henchmen and attendants was a man named Tannaji Malusra. I will only ask you to remember Tannaji, because Malusra is merely the name of the village—I know the village well—



II.—TORNA ; WHERE SIVAJI STORED HIS PLUNDER.

which gave birth to Tannaji, as brave a man as ever adorned the annals of the Mahratta race. Malusra is just the sort of village to give birth to a hero. Its frowning rocks, its lofty trees, its flowing brooks, in fact everything about it, conspired to fill the imagination with heroic ideas.

Such being Sivaji's education and early surroundings, I must ask you to bear in mind that in those days this part of the Mahratta country was in the kingdom of Bijapur. Now Bijapur was a magnificent city; its ruins are literally among the finest in the country. It still has a dome which is the marvel of architects, admitted to be the finest dome or cupola ever yet constructed by any nation. Thus Bijapur was then the Mahommedan capital. Well, Sivaji's father had a large grant of land from the Bijapur sovereign. The father having gone to the wars, Sivaji, who was then a young man, and his tutor were left in charge of

this property. Then Sivaji began to plunder. He would rob neighbouring villages, and thus get a little money and valuables together, which he would store in the fort of Torna, depicted in our illustration No. II. Torna is a highly picturesque place, built just upon the crest of the range; in the distant background of the sketch you will see another hill, to which I shall have to ask your attention immediately, that is the hill of Rajgarh. Sivaji first stored his plunder at Torna; and this really formed the original accumulation of money with which



III.—RAJGARH; THE HILL OF THE KINGDOM.

he began his political and military operations. But Torna was a large open hill on the top, steep at the sides no doubt, but it had a very large and flat summit, and therefore was not perfectly defensible against regular troops. So after a time, when Sivaji became more ambitious, he abandoned Torna and went to the neighbouring hill of Rajgarh, the top of which he thoroughly fortified. Rajgarh forms the subject of our third illustration. The summit of the hill seen in the distance in illustration II. is this same Rajgarh; you see the strongly fortified site repre-

sented in illustration III. Now, Rajgarh means the Hill of the Kingdom. Torna is a common local name, Sivaji gave no royal name to that, because it was only a place for storing plunder. But as he grew a little bolder and richer he fortified Rajgarh, and gave it the ominous name of the Hill of the Kingdom. It was then that he conceived the idea of establishing a dominion. It was about the time when he was occupying Rajgarh that Dadaji, the tutor, became rather old and timid, and he said to Sivaji, "You are only knocking your head against a rock by attempting to resist the Mahomedan power; you are only putting your neck into a noose. For God's sake give these things up and live quietly on your estate. Obey your father, who is a worthy servant of the Mahomedans, in the wars, and do not think of these ambitious things." Sivaji merely smiled and said, "I know my own business." Dadaji afterwards became sick, and drew near to his end; and when the shades of death began to gather about him, and his brow began to get cold and clammy with the sweat of approaching dissolution, he sent for his young master and said, "I now see it is no good offering you advice to keep quiet. After all, take the advice of an old man on the brink of the grave, and fulfil your destiny! Go in at the Mahomedans; I hate them more than you do; go in and win. Only remember, if you win, to think of your own religion; remember your ancestral gods; consider the Brahmins and the priests, and cherish the Hindoo religion. Drive these Mahomedans back into Central Asia, and once more let it be India for the Hindoos."

I am not exaggerating; some such speech, exactly as I have described to you, was uttered by Dadaji on his death-bed to Sivaji; and I can hardly imagine a more fit subject for an historical picture than this Dadaji on his death-bed giving advice to the future hero and the coming king to fight the battles of his country. The breath was hardly out of the body of Dadaji when Sivaji began to fulfil that behest, and the first thing he did was to take the fort of Singgarh. When I say he took it, I believe that he really won it by bribery, and that he gave some of his plunder to the Mahomedan commander, and so got the hill made over to him. In those days it was called by another local name, with which I shall not trouble you, but Sivaji having obtained possession of the hill, gave it the name of Singgarh, which means the Lion's Fort. However, he did not mean that; he meant the Lion's Den. I shall have a good deal more to say about Singgarh presently.

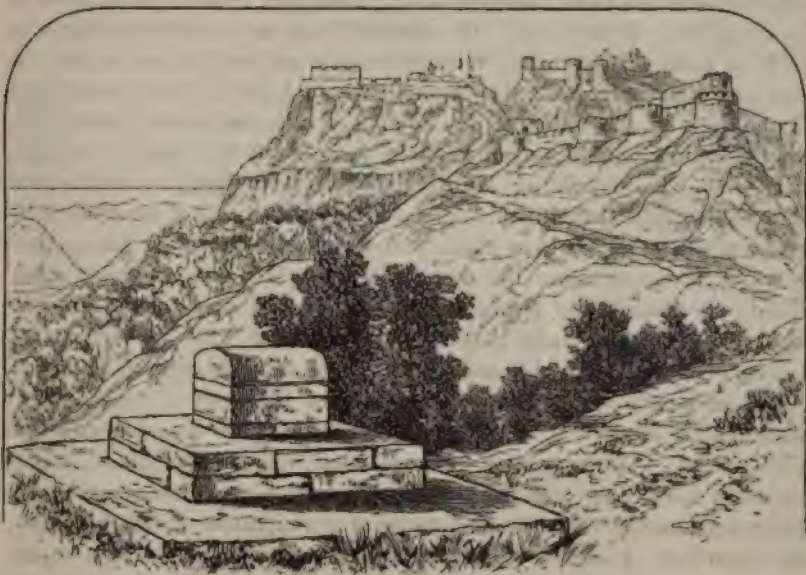
Now I must ask you to turn to illustration IV. Sivaji having made up his mind to rebel against the Mahomedan power, which was then represented by the kings of Bijapur, the king of Bijapur called him to account for his conduct. Sivaji of course gave evasive answers. A council of war was thereupon held at Bijapur as to what should be done. A Mahomedan commander, named Afzal Khan, stood up before the king of Bijapur and said, "O King, if you will give me 2000 horse, and

5000 foot, with some artillery, I will go against this mountain rat" (as Sivaji was called), "and within two months I will bring him before your Majesty in an iron cage." Well, the order went forth, and Afzal Khan marched leisurely from Bijapur towards Partabgarh, which at that time was one of Sivaji's forts. Sivaji had advanced to Partabgarh from Singgarh, and was there when this Bijapur expedition was launched against him. When Afzal Khan approached the place, Sivaji sent some ambassadors in unpretending guise, and said, "I hope you are not thinking of making war against me: I am a very humble person: if you will only come to visit me in my fort on any morning, you will see what a quiet creature I am, and I shall be able to give satisfactory explanations, and show that I am, as I ever have been, a loyal subject of the king of Bijapur." Afzal Khan thought he was going to have a walk over; so he said to Sivaji, "Well, the only objection I have to coming to your fort is the character of the hills, which are very steep, and the forest, mark you, is uncommonly thick and impervious; I do not see how I am to get through it." Sivaji said, "Do not trouble yourself about that; I, your slave, will cut a road through it to the foot of Partabgarh, my humble abode." The Mahommedans agreed. The rough places over the mountains were made smooth for them, and a very convenient path was cut for them, and when they got to the foot of Partabgarh, a fine broad place was cleared by the Mahratta woodsmen for the encampment of the Mahommedan army. They were made as comfortable as possible; but remember that they were surrounded by rocky hills and thick forests, and inside the thickets, Sivaji's marksmen lay hid in ambush. Having got them there, Sivaji formed a plan for murdering the Mahommedan commander, and surprising his army. The project was to induce Afzal Khan to come with a single attendant to meet Sivaji just outside the gates of Partabgarh, and then Sivaji would gladly hand over the keys. Sivaji said, "I will come with just one single attendant, and I hope your Highness will honour me by doing the same: you can easily kill me if you like." The Khan said he would be very happy to do as he was requested.

I must now ask you to observe the configuration of Partabgarh, as represented in our engraving. You see that, on the crest of a lofty eminence, there stands a towering fortress. Partabgarh is in the dip of the range. There is a dip, then the great fort, a dip, and then the range goes on again. The fort stands up boldly against the horizon. In the background on the left is a distant view of the Arabian Sea. I ought to mention that from all these high points on the Western Ghats you have a splendid view over the sea. In the morning, the time which our illustration represents, the sea is like a pale sea-green lake; in the afternoon it glitters radiantly towards the declining and setting sun.

I am afraid that the drawing cannot possibly represent fully the beauty of the scene, but you will readily see that it is a place of really

consummate beauty. There it was, on this autumn morning, in this fair scene of nature, that the desperate and bloody deeds meditated by Sivaji were carried out. Now, the evening before the meeting Sivaji's nerve failed him. I do not quite know why, but all these kind of men are a little superstitious, and suffer qualms of conscience, and he felt rather uneasy about the desperate crime he was to commit in the morning. So he went to the little temple at the top of the hill, and asked his mother to meet him there. He laid his misgivings, his forebodings, before her, and asked her in a filial way for her maternal advice. He said, "Shall I really kill this man in the way I have planned; and when I have killed him, shall I really



IV.—PARTABGARH.

order all my men in the thickets to fire upon the Mahommedan encampment?" And she said, "Yes; I have in this very temple consulted the goddess; Siva, the goddess of destruction, remember, after whom you are named." She said she had had a vision, and the goddess had commanded her to see that not one Mahommedan, if possible, should escape alive. Then she said to him, "Now, my son, you act worthily according to your mother's advice, and take my maternal blessing." I am not exaggerating. She solemnly gave him her benediction. Of course after that he felt a little more comfortable in his mind, and he gave the orders to his men.

I have explained to you that the Mahommedans had been enticed to go through the thicket. They had had an encamping ground prepared for them in the middle of the forest. In that forest lay concealed all

Sivaji's mountaineers,—several thousand of these Mahrattas. Their orders were that as soon as a signal gun should be fired from a bastion of the fort—the forest all around being alive with men—the Mahratta troops were to fire upon the Mahomedan army. These orders were delivered with coolness and precision by Sivaji after he had received the maternal blessing, that is, early in the night. In the morning the Mahomedan commander came forth from his encampment, and marched up to the rendezvous, the place marked by a dark tomb in the foreground, where he was murdered, as I shall explain to you. Sivaji also advanced from the fort. The gateway from which he issued is marked on the illustration, as a little dark spot in the wall. As he came, the Mahomedan and his followers said, "Dear me! what a mild, humble-looking person he appears." He advanced with a sort of hesitating step, as if he were a timid man. With him there was only one man, but that one man was the redoubtable Tannaji whom I have already mentioned. As he came on, the Mahomedan commander, in that sort of patronising way which Mahomedans of rank have, held out his arms to embrace him, with, "Good morning, Mr. Sivaji," &c. Then Sivaji bowed his head humbly beneath the Mahomedan's arms, and as he got close up to his body, with the tiger's claw already described he dug into his victim's bowels: then out came the dagger, followed by one desperate stab: then out flashed the sword, that Excalibur I have previously described. I need not say that the Mahomedan and his single follower were very soon despatched by Sivaji and Tannaji, especially as Sivaji had underneath his muslin garment the coat of mail already mentioned. Thus was the deed done. That very tiger's claw, that very sword, that very coat of mail, that very muslin dress, are to this day religiously preserved from generation to generation by the Mahrattas, and it is unpleasant to see the veneration with which they are regarded. I assure you, never were the sword, or the hat, or any of the relics of Napoleon or Frederick the Great of Prussia venerated so much by the French or Germans as these relics of Sivaji are to this day by the Mahrattas. Thus fell the Mahomedan commander. He was buried where he fell, and the Mahrattas had the grace afterwards to build a tomb over his remains—the tomb which you see sketched in the foreground. As the Khan fell, the signal gun was fired from the bastion; then of course the Mahomedan army, who were at breakfast in the encampment, were fired upon from all sides by the Mahrattas concealed in the forest; and you can imagine the destruction, the struggle, the misery, the flight which ensued. From that moment I need not say that Sivaji became an open rebel against the Mahomedans; and this event has always since been remembered in Indian history as the first blow struck by the Hindoo nationality against the Mahomedan conquerors.

The next point in Sivaji's history to which I have to ask your atten-



V.—VISHALGAHH.

tion is connected with the fifth illustration, which is that of the fortress of Vishalgarh. The sketch which served as the original to the illustration, was taken in the height of the rains, just after one of the violent showers, and that caused the brilliant cascades to go tumbling over the precipices. Now, bear in mind that Sivaji had become, by the event I have just described, an open rebel against the Mahommedan power. Well, the first vengeance of the Mahommedans fell upon Sivaji's father, who was perfectly guiltless of the crimes which his son had committed. He greatly regretted all that had happened, and made every possible apology, but the Mahommedans would not listen to such excuses, and ordered him to be seized. It was rather difficult to seize a man of that kind; however, the seizure was arranged through the agency of another Mahratta named Baji, who had an estate at a place called Mudhol. Baji showed a friendly demeanour towards Shahji, and asked him to an entertainment at Mudhol. Shahji came, suspecting nothing, and was seized, and sent to the Mahommedans at Bijapur. He was confined in a dungeon, and threatened with all manner of dreadful things—that his eyes should be put out, that his tongue should be cut to pieces, and similar inflictions, after the fashion of those days. However, the dutiful son, Sivaji, gave up some of his plunder, and bribed the Mahommedan gaolers, and so Shahji got out of gaol, and fled, but in flying he sent a message to Sivaji, and said, "Sivaji, if you love me, pay that fellow (Baji) out." Sivaji said, "Never fear, sir; you will visit me some day, and then you shall hear all that I have done to him."

Soon after this the Bijapur king determined to send another expedition, this time against Vishalgarh, where Sivaji then was, hoping that it would be more successful than the last against Partabgarh. The command of this expedition was given to this very Baji. The troops were to move out towards Vishalgarh, and Baji, naturally enough, went on ahead with his army, and thought he would spend two or three pleasant days at home at Mudhol. Intimation of this came to Sivaji at Vishalgarh, and he then determined upon one of his daring marches.

Mudhol is just 100 miles from Vishalgarh, and although a very uninteresting town, is strongly fortified, with a high wall of black stone all round it, I should say about 60 feet high. You will observe, marked with a dotted line, the road to it from Vishalgarh, which indicates the straight manner in which Sivaji marched to it. For really in these rushes and dashes Sivaji marched very like an arrow from a bow, or a shot from a cannon. One fine morning Sivaji and a picked body of horse and foot appeared before Mudhol, quite surprising the Mudhol people. How Sivaji got over the 100 miles in so few hours it is difficult to say; but certainly he appeared early in the morning, as I have perfectly well ascertained on the spot from the Mudhol people, for the tradition of course still survives. He himself started not later than the previous afternoon from Vishalgarh. I suppose the only way in

which he could have got there was this, that he ordered men to assemble in the wild country at different points beforehand (on a certain night in the dark half of the moon, as their expression was). They would go unobserved and concentrate at different places on the line of march, Sivaji remaining at Vishalgarh, and all the world supposing that he was up in his mountain fastness. He would then start in the afternoon, ride rapidly say for 50 miles, get to the rendezvous at 8 o'clock, and would accomplish the rest of the march during the night; and so he appeared before Mudhol in the grey of the morning. His men were excellently good hands at escalading; they thoroughly understood rope ladders and grappling irons, and so they climbed the wall in no time; and the Mahommedans in Mudhol were completely surprised. In a few moments Baji's palace was surrounded, Baji was dragged out, brought before Sivaji, out flashed the Excalibur, and down dropped Baji's head upon the ground. There was no more bloodshed, but then began one of the most relentless and ruthless plunderings of which the Mahrattas were ever guilty, and which is remembered vividly by the Mudhol people to this very day, as I can personally attest. In about two hours the whole of Mudhol was cleaned out absolutely, nothing remained. Sivaji went off with all the jewels and coins, and the fine articles fastened on to the saddle-bows of his cavalry; and he returned straight to Vishalgarh.

This was a very unpropitious beginning for the Mahommedan expedition against him, and I need not trouble you with the military particulars of all that followed. However, Vishalgarh was not taken, and Sivaji remained entirely master of the situation.

I have mentioned that Shahji, the father, obtained his liberty, and somehow in a short time he managed to make peace with the Bijapur king, and to visit his son at Vishalgarh. He had not seen this redoubtable, this tremendous son of his since he left him almost an infant in his mother's arms at Junnar, so of course the meeting between the son and the father was rather touching. Sivaji, this truculent fellow, came forward to meet his father. The father was riding upon a fine horse; the son would not ride; far from it. He went forth on foot several miles from the fort to meet his parent. He would not sit down in the paternal presence, and he humbly related to his father how he had fulfilled his behest, and had with his own hand cut off that treacherous Baji's head, and scrupulously plundered Mudhol to the last farthing. He hoped, as he had received his mother's blessing last time, to receive his father's blessing this time, which I need not say was abundantly given him. But the father being of a practical turn of mind, criticised Vishalgarh, and said it was not a very advantageous position; he thought that it might be commanded and taken by the Mahommedans, and suggested to him that he should establish his fortress in a better situation, indicating Raigarh, which you will see on the map. So Raigarh afterwards became the seat of the Mahratta

kingdom. From that place went forth decrees which had validity right over the continent, and the establishment of Raigarh was due to the sagacious father who visited his son at Vishalgarh after this Mudhol affair.

I must now call your attention to illustration No. VI., which represents Singgarh, already mentioned. You will see the city of Poona in the middle distance, with the river in the foreground. From this river are drawn many fine canals for irrigation, involving geographical problems with which I have not time to trouble you. In the distance stands up like a rigid square, Singgarh, or the Lion's Den.

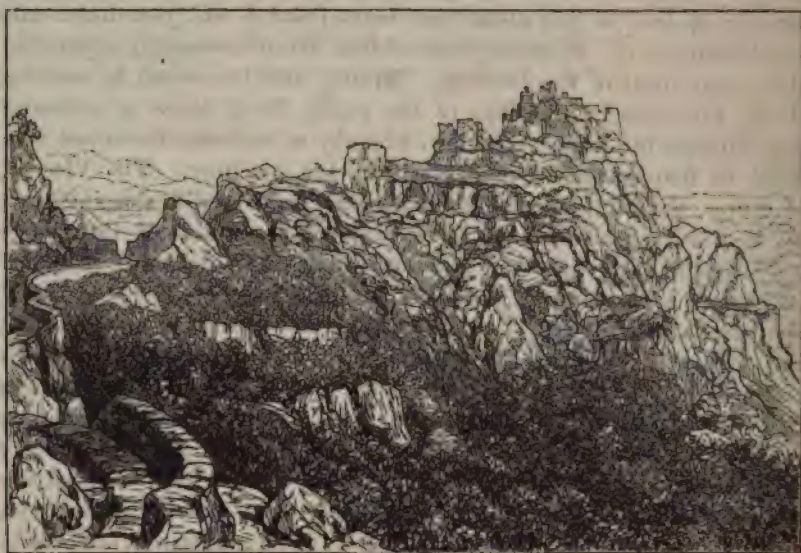


VI.—DISTANT VIEW OF SINGGARH.

At the time to which the narrative has now arrived, the Bijapur kingdom had been subdued by another Mahommedan power, which was no other than the Mogul Empire. Therefore to the king of Bijapur had succeeded the Great Mogul, and the Great Mogul had a Viceroy at Poona. Poona was then regarded, like Peshawur in our days, as an important frontier position. The Western Ghats were to the Mogul Empire what the North-Western frontier is now to the British, and Poona was to them just what Peshawur is to us; so they had a Mahommedan Viceroy at Poona supported by a force. Sivaji, on the other hand, was at Singgarh. The Viceroy considered that Sivaji was a very dangerous neighbour; and he dreaded that something awkward would happen; so he took very particular precautions that no armed men should be admitted into Poona, which happened to be at that time an open city. Sivaji nevertheless determined to do a daring deed which should flagrantly insult the Mahommedan Viceroy. His idea always was to do an audacious thing which should have a great moral effect on the whole of the country round, and in that way to flout the Mahommedan authority. He acted as follows. As he could not get into

the city armed, he managed to go apparently unarmed, with thirty followers. He, and they of course, had arms concealed under their cotton dresses. He joined a marriage procession which was entering the city, and thus contrived in disguise to enter unobserved with the crowd. His bold project was facilitated by the fact that the Mahomedan Viceroy had taken up his Viceregal quarters in the very house in which Sivaji had been brought up, under his tutor Dadaji. I have already spoken to you about that house; and I told you that a tale would hang on it. In consequence of this, Sivaji thoroughly understood the ins and outs of the dwelling. Mixing with the crowd he and his thirty followers in the dead of the night, Sivaji knew a particular way through the kitchen window, whereby an entrance for armed men could be found; and thus got within the dwelling. The Viceroy, of course, according to the Mahomedan fashion, was sleeping with his staff on one side of the house, and all the ladies of the family were sleeping on the other side; so, after Sivaji and his men had entered by the window, they had to pass not far from the ladies' apartments, and one of the ladies heard the sound of men moving. She instantly shrieked. The shriek reached the Viceroy and his staff; but before they could do much, Sivaji and his men made a rush and were on them. The Viceroy was in such a hurry that he was jumping out of the window; and as he had got his right hand on the window-sill letting himself down, Sivaji came up with the Excalibur and just cut off his fore and middle fingers. The Viceroy naturally let himself down extremely quick after that; and immediately afterwards there was a row all over the city. Sivaji and his men had decamped in the darkness and confusion; and, arrived at the outside of the town, gave notice to others of their party, who had planted beacons from point to point on the way to Singgarh, to pass on the signals for illuminating the peak of Singgarh. Singgarh is a very conspicuous object from Poona, and thus the inhabitants learnt at midnight that the redoubtable Sivaji had found his way into the Viceregal palace and cut off the Viceroy's fingers, and was illuminating Singgarh in honour of the event. This was a thoroughly insulting mode of procedure, recounted in after times with glee by the Mahrattas. The next morning the Viceroy sent his Afghan cavalry against Singgarh. You may imagine the sort of swaggering way, the proud, bombastic manner, in which the Mahomedan cavalry would behave, stroking their beards, twirling their moustachios, and saying they would soon bring Sivaji back in chains, and so forth. The cavalry went, and approached Singgarh. Of course there was a puff of smoke from the top; then a cannon ball in the middle of a squadron of horse. Presently from behind a rock, or tree, a little spit from a Mahratta musket, and a Mahomedan saddle was emptied. In a very short time the cavalry came back utterly crestfallen, with half their number killed or wounded, and the Mahomedan Viceroy the next day sent in his

resignation to the Emperor. He could not possibly have signed it, because he had lost the two fingers of his right hand. This was an insolent exploit, which is to this day freshly remembered by the Mahrattas. That is the first thing that happened at Singgarh. I shall have to revert to Singgarh directly; meanwhile I ask your attention to Bowragarh, depicted in illustration No. VII.



VII.—BOWRAGARH.

Bowragarh is one of those grand situations on the crest of the Ghants, from which you have a distant view of the setting sun over the sea. It was in that neighbourhood that some of Sivaji's daring exploits by sea were performed. He was great not only on land but at sea. He used to plunder all the rich flourishing seaports on the coast, and carry the plunder, as usual, to the hills. On one of these occasions, while he was sailing with all his plunder from one part of the coast to the other, he was overtaken first by contrary winds, and then by a severe storm, and he became extremely indisposed. It is a most extraordinary thing, but after this, for a time, he quite lost his nerve.

The Mahommedan Emperor having heard of the manner in which his Viceroy had been insulted, sent a large force of Rajpoot soldiers against Sivaji. There again Sivaji was a little superstitious. He had a kind of fear of these Rajpoots as being high-born warriors. The Mahrattas are low-caste men themselves, and they have a kind of veneration for upper-caste Hindoos. He was rather afraid of the redoubtable Rajpoot soldiery, was very much indisposed by the storm at sea, and he lost his resolution and determined to surrender a number

of his forts. Among others he surrendered this very fort of Singgarh, after which he went up to pay his respects to the Emperor at Delhi. The Emperor detained him on various excuses, and then subjected him to confinement. However, he soon escaped. He used to have capacious baskets of fruit and flowers sent to and from his place every day, and one fine morning he put himself into a basket and was carried out under the belief that the basket contained nothing but fruit and flowers. Outside he met the redoubtable Tannaji, and he and Tannaji escaped in disguise, and actually walked all the way from Delhi to Poona. After that they declared that they would rebel openly and for ever against the Great Mogul.

Recollect that Sivaji had just before given up Singgarh, but he was still at Raigarh, already mentioned. His aim now was to retake Singgarh, and the retaking of that place was entrusted to Tannaji. It was planned that Tannaji should escalade Singgarh with a thousand men. If he succeeded in taking the place he was to light the thatch of a store-house which was on the top of the fort. This burning thatch making a flame would be seen from Raigarh, and Sivaji would know that Singgarh was taken.

Tannaji with his thousand picked men advanced against Singgarh. When I say "advanced," I mean that what they really did was this: the men in the different villages got orders to rendezvous at the foot of the Singgarh precipice. I know that precipice well, and so do many other Englishmen, and it truly is an awful place. For hundreds of feet this black trap rock forms an absolute wall as straight as possible. Well, Tannaji had the ladders of rope and the grappling irons with him, and with these rope ladders up they went. There are many military men present, and I put it to them whether that is not a very daring, dashing thing to do, and whether it could be surpassed by any troops in the world. Alexander and his Macedonians used to do something of the same kind.

In this way Tannaji and 300 out of the thousand got up the rock. Why he took only 300 men with him I really never was able to ascertain; but it was a somewhat unfortunate arrangement. At any rate he left 700 men under the command of his brother as a reserve, with instructions to move up if they should have an impression that anything was going wrong. So Tannaji and his three hundred got up in the dead of the night to surprise the Rajpoot garrison. When they had climbed to the top they were quite unobserved, but somehow one of the soldiers of the garrison suspected he heard something, he peered about, and came quite close to them. A deadly arrow answered his inquiry, but as he fell dying he uttered a cry. This cry alarmed the sentinels, and in an instant a blue light was lighted, which displayed Tannaji and his three hundred. Of course there was nothing for it then but to go in at them. Tannaji charged them and was immediately

killed. Seeing him killed the men lost heart, and tried to get back to the ladder, and down the precipice again; but the sound of firing had alarmed the reserve, and every one of them had come up also. They met the three hundred retreating. Then Tannaji's brother showed himself a worthy brother. He made a speech to the men, which is not a bad specimen of Mahratta military eloquence, and I will endeavour to repeat it to you. He said to them: "Come, men, you must go on, for I tell you I have cut the ladders, and there is a precipice behind you, and there is the enemy in front; moreover, there is among the enemy the dead body of your common father." I should mention that it is usual for Mahratta troops to style their commander their father. He added: "If you do not rescue the body it will be buried by low-caste men."

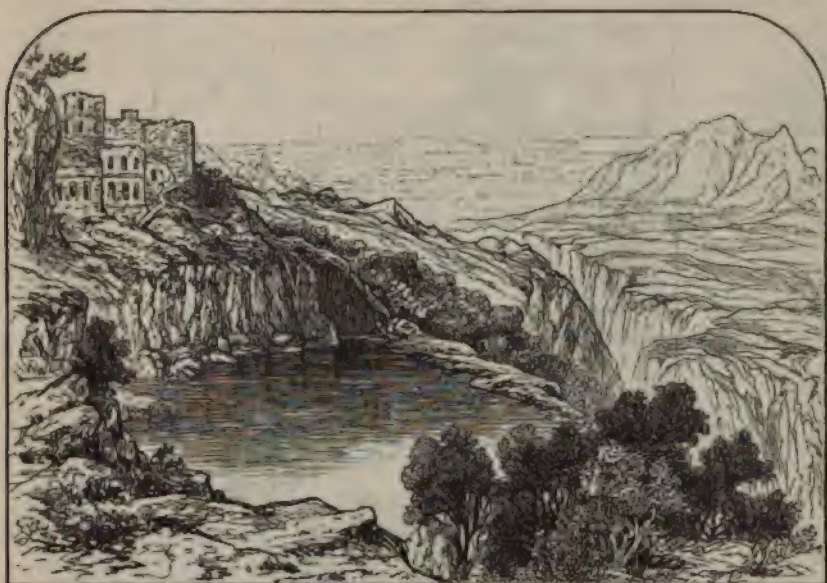
This was an argument which was irresistible to Mahrattas; they rushed on with their war-cry, and overcame the Rajpoots, some of whom were killed, but the greater part of them jumped over the precipice, and there they lay, mangled bodies, at the bottom. The signal fire was then lighted with the thatch of the store-house, and Sivaji at Raigarh knew that Singgarh was taken.

The authentic tradition is that when, next day, Sivaji heard that this fort had been recaptured at the price of the life of Tannaji, he burst into passionate wailing and lamentation. I cannot possibly attempt to reproduce it, but you can imagine the sort of language which a man of that fiery passion and energy would use. He said something of this kind: "The lion's den is taken, but the lion is killed; what have I gained by winning a fort, and losing such a man as Tannaji?" Such was the end of the life of the bravest and most faithful of Sivaji's dependents.

This completes the story of the adventures of Sivaji and his men. I hope I have made it clear how the rugged nature of the country fostered this daring, this gallant spirit both in master and in men.

The next illustration represents Raigarh. By the map you will perceive that this place is situated on the western, or Konkan side of the mountain range. The enemy of the Mahrattas was on the east; therefore, for a Mahratta fastness it was a great thing to be on the west of the range for this military reason, that they placed the crest of the range, the high peaks, and the rugged mountain roads between them and the enemy. Therefore Raigarh, according to the sagacious suggestion of Sivaji's father, was occupied as the last and the greatest of the Mahratta strongholds. There it was that Sivaji established himself finally as Sovereign of Western India. You will observe the way in which it is arranged. In the foreground there is a little lake or tank on the summit of the mountain. This sort of lake is constructed in this wise. You first try to hit upon some point where there is likely to be a spring, some point on the top of the mountain, but which has some higher peaks near it; consequently the

water collecting from the higher ground will form a spring. Then over this spring you make a quarry, whereby you obtain the stone for your palace or your fort, and with the same operation you excavate an artificial tank to secure your water supply. The ascent of Raigarh is exceedingly steep. Of all the ascents I have ever made in India, the Himalaya included, that of Raigarh is the worst. It is not only that the side is so steep, but the heat is so trying. If you ascend any other peak on the crest of the range you do so from a tolerably cool climate, but in ascending Raigarh you have to start from the level of the sea.



VIII.—RAIGARH.

It was here that Sivaji established his dominion, and reigned, and died at the early age of 53, after having rebelled, plundered, fought, and ruled for about 30 years. In this fort were collected the wealth and riches of half India; treasures in Spanish dollars, sequins, and the coins from all Southern Europe and all Asia. There, after his early death, he was succeeded by a son, who committed the most horrible crimes, and who died an equally horrible death. A description of the life of Sambaji, the son of Sivaji, would make even a more startling narrative than that which I have given this evening.

On the top of Raigarh is the tomb of Sivaji. You may be aware that the Mahrattas do not bury their dead; no Hindoos do, they practise cremation, and the ashes are buried in the tomb. I myself on one November day carefully examined the tomb of Sivaji. You may think I am romancing, but those who know that part of the Deccan will bear me

out, when I say that at that season of the year there is a particular blue flower—I have forgotten its name—of the most tender and delicate beauty; it grows on all parts of those hills where the soil is rich. I suppose they put rich soil over the tomb of Sivaji, for when I was there it was one mass of these tender blue flowers, and a more poetic contrast you cannot imagine, than that a bloom of such exquisite delicacy should be covering the grave of a man so desperate, so violent, and yet so great



IX —ARTHUR'S SEAT AT MAHABALESHWAR.

and statesmanlike as Sivaji. Thus the hero was buried on the summit of his hill commanding a view of the scenery fraught with associations of his deeds, and within sight of the Torna and Rajgarh, where his dominion was founded, and which he loved so well.

Sivaji was not only a bold man, such as I have described him, but he had peculiarly the power of arousing enthusiasm in others, and he was the man who raised an abject subject race from nothingness up to empire. If it had not been for him there might have been no Mahratta uprising; but that uprising, on the other hand, would never have been

possible if it had not been for the rugged and mountainous country which forms the subject of our geographical lesson this evening. But besides that, Sivaji was a great administrator: he founded many institutions which survived for more than one century, during which his successors enjoyed imperial power; and the official titles of all his state departments and departmental officers are preserved among the Mahrattas to this day. So much for Sivaji and his biography.

I will ask your attention now, in conclusion, to the two pictorial illustrations numbered IX. and X. No. IX represents the scenery of Mahabaleshwar (Arthur's Seat), the summer residence of the Bombay



X.—THE BHORE GHAT INCLINE.

Government and its principal officers, and of the ladies and gentlemen who form the society of Western India. It is close to Partabgarh, which I have already described, in the midst of the Mahratta country; and now where all these desperate deeds were committed of old, there are picnics, and Badminton, lawn tennis, and the like are being played. You will see that along the rocks there are traces of the indurated lava lying layer upon layer, one over the other. The whole is, as it were, a series of regular horizontal stripes from end to end. In the middle distance there stands up the very Partabgarh which I have been describing to you this evening, and in the distance, as usual, there is the Arabian Sea.

The last illustration (No. X.) represents the Bhore Ghat incline, the view being taken at the height of the rainy season. The Western Ghats, rising straight up from the sea-coast, catch all the clouds and vapour as

they rise; which clouds are condensed into torrents, buckets, sheets of rain; and thus after one of these rain-storms the whole mountain-side is covered with waterfalls and cascades. It is through or along the whole mountain-side that the railway runs with magnificent engineering works; and this brings me, in conclusion, to the great difference there is now in the state of things in these Western Ghauts as compared with Mahratta times. I have shown you how difficult, in a military point of view, was the topography of these mountains. Now the British are penetrating them in every direction with roads and railways. First of all, consider the roads. Where before there was a rugged mountain pass which a mule or a pony or a single pack-bullock could just laboriously ascend or descend, there is now a regularly engineered road with complete gradients, levels, zigzags, and the like, up which wheeled carriages pass by hundreds and thousands during every traffic season, and by which also artillery can move, so that you see what a great political engine one of these roads is. Consider for a moment the number of roads the British Government has made in these hills. I will enumerate them to you. First, there is the Thull Ghat Road; next the road opposite Junnar; the Bhoré Ghat Road; the road opposite Rajgarh; the road opposite Partabgarh; those opposite Vishalgarh, Goa, and Karwar; so that you see we have pierced these mountain fastnesses by what may be called the resources of civilisation. Besides these, we have two lines of railway, one running from Bombay by the Thull Ghat towards Northern India, the other from Bombay by the Bhoré Ghat towards Poona and the Madras coast; besides which a third, under the auspices of a British Company, with the assistance of the Portuguese Government, is about to be made from the coast at Goa eastward. In this way the arrangements of the British Government are very different from, and I hope vastly superior to those of their Mahomedan predecessors.

One word more before I sit down. The spirit which I have been describing to you, my brother Englishmen, as prevailing among the Mahrattas in the Mahomedan times, survives to this very hour. These qualities depend upon the topography and the physical surroundings. To this day the Mahrattas are within sight of these everlasting hills, and they have the same spirit and courage as their forefathers. You say, "Have we had any recent proofs of this?" I say we had some very unpleasant proofs so recently as 1879; for, would you believe it, owing possibly to the excitement caused by the war in Turkey, possibly also—one cannot tell exactly—in consequence of the occurrences in Africa, a certain amount of excitement arose among the Mahrattas: plundering began exactly in the same way; though we had an army and all our modern resources at Poona, nevertheless gang-robbery set in; men of rank were murdered, large quantities of property were carried off right up to these very hill fastnesses which I have been describing to you, and I assure you it took all we knew in the Bombay Government to put

that affair down in the course of two or three months. Some leaders came forward; regular bandits were organised. One of these actually called himself Sivaji the Second, and offered a reward for the Governor's head. You know that the Governor's tours were notified beforehand, and it had been understood that I was going to take sketches on the top of this very Rajgarh and Torna. They said if I did I should never return alive. Of course those were empty threats, because I did go all the same, but I took precautions; otherwise it is possible I should not be addressing you this evening. On the other hand, these people are thoroughly good men in their way. You cannot altogether blame them for asserting their nationality now and then; but as long as you manage them well and assert your physical and moral superiority, they are thoroughly brave fellows, and will do your work for you. We must remember that the soldiers of Sivaji, who used to be called the Mawulis of the Deccan, and the Hetkaris of the Konkan, are now wearing the British uniform, and that the descendants of Sivaji's soldiers have carried the British standard, not only in India and Afghanistan, but also in Persia, in Abyssinia, in China, and in the Mediterranean.

In conclusion, let me say that I want you to carry home not only a vivid idea of this beautiful scenery, but a geographical, a political, and an historical lesson. The lesson is that human character is greatly formed by physical surroundings; that so long as we choose to hold empire over such a country as that of Western India, we must be vigilant, and must figuratively, as well as actually, keep our powder dry; that if we are vigilant our empire is safe, and that if we are neglectful it is in danger. For depend upon it, if any serious blow were to be struck at our power by sea or land in any part of the world, excitement would once more arise among these very Mahrattas. Therefore, gentlemen, I hope, as members of the Royal Geographical Society, you will carry home with you to-night this lesson, that geography has its noblest function in describing the theatres of human action, and that he who would understand history aright must have a sound basis of geographical knowledge.

On the termination of the lecture,

Sir BARTLE FREER, on the invitation of the President, rose and said that he could testify, from the experience of some of the best years of his life, to the perfect truthfulness of the pictures which Sir Richard Temple had laid before the Meeting. He did not know that he had ever seen the localities better portrayed than in those sketches. As Sir Richard Temple had so eloquently said, they explained, to a great degree, that wonderful union of physical energy and religious enthusiasm which inspired the leaders and founders of the Mahratta Empire. No doubt if there had been more time, the lecturer would have referred to ages far anterior to those which he had alluded to: namely, those when the Greek merchants met Hindoos on that same coast and left a record of their commerce and their alliances. In that district there had always been a strong national spirit; and Sir Richard Temple had explained how important it was to those who ruled it to understand the feelings of the people, and

to have for them that sympathy without which such a race could never be governed. The lecturer had made clear some of the secrets of the success which had attended British attempts to govern India. Wherever he went, he did not fail to enter into the spirit of the people over whom he had to rule. Their scenery caught his eye and employed his pencil; but he also studied their manners, their customs, their feelings. He was sure that the Meeting would agree with him in hoping that, on some other occasion, Sir Richard Temple would tell them more of the history of the country, and that he would publish in some more permanent form, not only the productions of his pencil, but the legendary history of the land which he so well understood.

The PRESIDENT, in proposing a hearty vote of thanks to Sir Richard Temple for his address, said he was sure they would all agree with him that the mixing of history and geography made both subjects more interesting; and after seeing the vivid representations of the geographical aspect of the country which had been put before them, they would receive such an impression with regard to it as they would never forget. There were few records more honourable to British arms and British civilisation than the conquest of the Mahrattas, which called forth all the military skill and valour of our race under Sir Arthur Wellesley, and all the civil genius of Mr. Grant Duff's godfather, Mr. Mountstuart Elphinstone. Many a man, of whom England and India might be proud, was engaged in subduing the Mahratta race which had previously overrun all India. He was certain that the Society felt that their thanks were due to Sir Richard Temple for his eloquent lecture, and to his brother Lieutenant Temple for the admirable drawings which he had placed before them. They were a pair of brothers to whom he might venture, without pedantry, to apply the old Roman saying of "*Par nobile fratrum*."

The Rev. W. P. Johnson's Journeys in the Yao Country, and Discovery of the Sources of the Lujende.

Map, p. 520.

THE Rev. W. P. Johnson has favoured us with a short letter dated from Chitesi's on the Nyassa, March 5th, 1882. It is accompanied by a rough map indicating his principal routes through the Yao countries. The readers of the 'Occasional Papers,' published in London by the Universities' Mission, and of our own 'Proceedings,' are aware that it was Mr. Johnson who founded a missionary station at Mwembe, Mataka's town, in the heart of the Yao country. He carried on his work there with much promise of ultimate success until Captain Foot's interference with one of Mataka's slave caravans, near Lindi, led to unfriendly demonstrations. The lower class of slave-dealers not unnaturally supposed that Mr. Johnson acted as a spy upon their doings, and burnt the missionary buildings, whilst the chief himself hinted that it would be better for the missionary if he left the district for a while, until the storm had blown over. On this friendly advice Mr. Johnson acted, and immediately returned to Masasi and Zanzibar, there to consult with Bishop Steere as to his future proceedings. This happened towards the end of August 1881.

During his residence among the Yao, Mr. Johnson had seen much of the people and the country, and at least some of the results of his investigations will be found embodied in the accompanying map. His most important excursion took place early in 1881, when ill-health rendered it advisable for him to go to Livingstonia in search of medical advice. It was on the return from the lake, in April, that he turned aside from his route, and came upon the northern end of Lake Shirwa, which there discharges the Lujende river.*

Having determined, after consultation with the bishop, to found a station on the shores of Lake Nyassa, in Ngoi or Kungoi, five days north of Losewa, Mr. Johnson left Zanzibar on December 2nd, and arrived at Masasi on the 23rd of the same month. On the 29th he started for the lake, accompanied by the Rev. C. A. Janson. The two travellers reached the lake on February 9th, 1882, but as Mr. Janson died on the 21st Mr. Johnson is once more alone.

Mr. Janson's journal, published in No. XIX. of the 'Occasional Papers,' furnishes some interesting particulars of the route followed. The Rovuma river was ascended as far as Mpanda's village, where the two missionaries turned to the south, towards Unyango, the more direct road to the lake being thought to be impracticable, owing to the presence of prowling bands of the Gwangwara tribe. Mr. Janson estimates the distance from Chitwanga's village on the Rovuma to the lake at 345 miles, which was performed in twenty-seven days of actual travel. From Mpanda's to Unyango is 159 miles, thence to the lake 65 miles.

The Rovuma, as far as traced, flows partly through a broad valley, covered with grass, and dotted with clumps of trees, among which palms, euphorbias, and baobabs are conspicuous; partly it is hemmed in by rugged hills, and the gurgling sound of its rapids is quite audible even at some distance from the river. The country is fairly populous, and "shambas" are met with at frequent intervals. A short distance beyond the village of Luundi (who belongs to the Nyassa, and not to the Yao tribe) the travellers arrived at one of the usual ferries across the Rovuma, and there encountered a slave-caravan going to the coast. The river here is about 600 feet wide. The chief, Kanyinda, lives on an island about three miles long, and thickly dotted with houses, whilst villages line both banks below. Chipogola, alias Chemsuru (he has a third name which Mr. Janson forgot to put down) invited the travellers to stay with him for a few days, and they accepted the invitation. Chipogola and his people formerly lived on a high hill near Mataka's town, and the change to the river does not appear to have agreed with them, for they were suffering from an "epidemic," which Mr. Janson declares to have consisted in a general colic.

Between Mpanda's and Unyango it was necessary to cross an uninhabited wilderness. During the ten days occupied in this journey the

* See 'Proceedings,' 1882, p. 47.

porters only received one meal daily, notwithstanding which they gave no cause for complaint. The whole of this region is covered with forest, and whilst the soil in the north is sandy, that in the broad valley of the upper Luchulingo was found to consist of the red clay so common throughout Eastern Africa, even to within a short distance of Cape Guardafui. The Usonyando, a biggish stream, with steep muddy banks, was crossed on the fourth day, and the Luchulingo (the Lukeringe of old maps) two days afterwards. The latter is a very considerable river, and cannot be forded when in flood. It takes its course through a broad wooded valley, and traces of elephants abound near it.

Beyond this river the caravan climbed the steep and picturesque Ichumundu Hills, which are wooded to their summits, as is all the country within sight. These hills are evidently a spur from the upland which stretches between the Luchulingo and Msinja valleys. Masuku trees abound in them. They bear a fruit about the size of a lime, which drops to the ground when nearly ripe, and is eagerly collected by passing travellers. Having surmounted these hills the travellers once more descended into the broad valley of the Luchulingo, up which they travelled towards the conspicuous double peak of Unyango, around which cluster the thousand huts constituting the village of Mhange's people now governed by Kalungu. The country around this settlement is bare of trees, and fairly cultivated. Food is plentiful.

Leaving this place and its hospitable entertainers on February 3rd, the travellers breasted the highest mountains yet encountered by them, the ascent being rendered difficult on account of the slippery state of the road. The scenery, however, amply compensated for the fatigue that had to be borne. Reaching the summit of the first ridge the eye ranged up a charming woodland valley, the banks of whose rushing stream were diversified by curious piles of rock, rising at regular intervals, not unlike the ruins of ancient castles. From the head of this valley the twin-peak of Unyango was seen to stand out clearly against the sky towards the east, whilst in the south the hills died away in the plain, and in the west, far below them, lay another valley, with the numerous hamlets of the late chief Chi Mambo. Ascending the ridge which bounds this valley to the north, and passing a cascade embedded in ferns and creeping plants, a summit was reached, whence, through a gap in the western range, a glimpse was obtained of the smooth and shining surface of the Nyassa, whilst close by rose the craggy peak of Chiwagulu, with houses clustering thickly around it.

A descent from these hills led into the broad valley of the Msinja, a swift stream, here six feet deep. Beyond it another range of wooded hills had to be crossed before the range was reached. Descending the beautiful valley of the Nehimanje (Mr. Janson says Luchilunge?), passing a shamba, whose aged owner permitted the men of the caravan to help themselves to his mhogo, then past a grove of baobabs, the

travellers at length emerged upon a pebbly beach. The bold heights marking the site of Losewa were visible to the south, whilst close by, under the shelter of a promontory, there rose a small hamlet of Wanyassa, its huts built of reeds with conical roofs of grass, and a part of the floor slightly raised to serve as a bed. Masanje was reached the next day. It is a considerable place of 700 huts, close to the water's edge and defended by a *boma* of thick poles. The inhabitants are expert fishermen. They keep fowls and ducks, and also boast the possession of seven cows and fifty goats.

It was here that Mr. Janson died. In an appendix to his journal, Mr. Johnson states that Chitesi's town, to which he proceeded after his companion's death, is a very considerable place, where oxen, sheep, and goats abound. He had fallen in with Mr. J. Stewart, C.E., of the Livingstonia Mission on Lake Nyassa, and in conjunction with him, proposes to establish a ferry at Chitesi's, in opposition to that at Losewa, which is completely in the hands of the slave people.

Mr. Johnson writes with reference to his map that he has "taken the lower shores of Nyassa and the junction of the Lujende and Rovuma from Livingstone's map. "I have had no instruments," he says, "but the relative distances I can vouch for, and the compass bearings roughly, though I had great difficulty in identifying the places along the Rovuma as given on Livingstone's map, all the places having now different names along that river." In putting Mr. Johnson's work into shape our cartographer has adopted the position of the Rovuma and Lujende as given in Mr. Thomson's map, and the outline of the Nyassa (except where it differs from Mr. Johnson's delineation) from the Society's large map of Equatorial Africa. In addition to the rough sketch just received he has been able to make use of a more carefully drawn map which shows Mr. Johnson's journey up the Lujende river to Mataka's. Livingstone's latitudes along his route from the Rovuma to the lake have of course been retained, but his longitudes have been shifted so as to fit in with Mr. Johnson's work. All names not taken from Mr. Johnson's maps or papers or Mr. Janson's journal are written in hair-line. Ngoi or Kungoi finds no place upon Mr. Johnson's map, but we presume it is the name of the district of which Chitesi is chief.

In a note placed upon Mr. Johnson's map we are told that the whole of the country from the lower end of Lake Nyassa to the junction of the Lujende and Rovuma is inhabited by the Yao tribe, excepting a tract along the lake, between Masenje's and Chitesi's. The Matimbwe, Wanyassa (Maganja), and Makua who live scattered among the Yao towards the north-east, speak the Yao language in addition to their own idioms. Yao is spoken in four dialects. The Masanyinga (Mazinga) Yao live in three districts, on the Rovuma, on the Lujende, and on the lake; their chiefs being Chipogola, Kandulu, and Makanjila. The Mchinga Yao live to the west of the Upper Lujende, between Nyambi's

and Mtarika's villages. The Amakali Yao, on the Luchulingo, have Chiwagulu and Unyango for their principal seats. And lastly, there are the Yao of Mwembo, whose chief is Mataka. The predatory tribe of the Gwangwara are said to live about ten days' journey from Chitesi's.

The great chiefs of the country are Chitesi and Makanjila on the lake; Mponda, on the Shire; and Mataka, near the Lujende. Each of these commands 6000 men. Next to them rank Mtarika and Kandulu on the Lujende, the chiefs of Chiwagulu and Unyango to the west of the Luchulingo, and Masenje on the lake, with 4000 men each. Inferior chiefs of some note are Mponda, Chipogola, and Kanyinda on the Rovuma; Nyambi in the south; and Chiwanle near the lake, not far from Makanjila's.

The Kong Mountains. By Captain R. F. BURTON.

(Read at the Evening Meeting, June 26th, 1882.)

THIS range, which has almost disappeared from the maps, may have taken its name either from the town of Kong on the southern versant; or it may be a contraction of "Kongkadu," the mountain-land described by Mungo Park. MM. Zweifel and Moustier, who did *not* reach the Niger sources in 1879, explain "Kong" as the Kissi name of the line which trends from north-west to south-east, and which divides Koronko-land from Kono-land. When nearing their objective they sighted the Kong apex, Mount Daro. Older travellers make it a latitudinal chain running nearly east and west, with its centre about the meridian of Cape Coast Castle; and extending 500 to 600 miles on a parallel of N. lat. 10°. Westward it bends north behind Cape Palmas, and, like the ghauts of Hindostan, it follows the line of seaboard. About the parallel of Sierra Leone the feature splits into a network of ranges, curves and zigzags, which show no general trend. The eastern faces here shed to the Niger; the western to the various streams between the Rokel-Seli, the Gambia, and the Senegal; and the last northern counterforts sink into the Sahara Desert. The western versant supplies the gold of Senegambia; the southern that of Ashanti and Wasá. The superficial dust is washed down by rains, floods and rivers; and the dykes and veins of quartz, mostly running north and south, are apparently connected with those of the main range.

That such a chain must exist is proved by the conduct of the Gold Coast streams. The Ancobra, for instance, which often rises and falls from 20 to 40 feet in twenty-four hours, suggests that its sources spring from an elevated plane at no great distance from the sea. The lands south of the Kong Mountains are grassy and hilly with extensive plains. This is known through the Donko slaves, common on the

coast. Many of them come from about Salagha, the newly opened mart upon the Upper Volta; they declare that the land breeds elephants and ostriches, cattle and camels, horses and asses. Moreover, it is visited by the northern peoples who cross the Sahará.

Captain Clapperton, in his second journey, setting out from Badagree for Busa (Boussa), crossed a hill-range which would correspond with the Kong. It is described as about 80 miles broad, and said to extend from behind Ashanti to Benin. The traveller, who estimated the culminating point not to exceed 2500 feet, found the rugged passes hemmed in by denticulated walls and tors of granite, 600 to 700 feet high and sometimes overhanging the path. The valleys varied in breadth from a hundred yards to half a mile. A comparatively large population occupied the mountain recesses, where they planted fine crops of yams, millet, and cotton. The strangers were made welcome at every settlement. Ascending hill after hill they came to Chaki, a large town on the very summit of the ridge. The Caboceer had a house and a stock of provisions ready for his guests; put many questions, and earnestly pressed them to rest for two or three days. When the whole chain was crossed they fell into the plains of Yarriba (Yoruba).

The next eye-witness is Mr. John Duncan, who visited Dahomey in 1845. King Gezo allowed him a guard of a hundred men, in order to explore with safety the Mahi or Kong Mountains. His son and successor was not so generous; he systematically and churlishly refused all travellers, myself included, permission to pass northwards of his capital. The life-guardsmen found the chain, which is distant more than a hundred miles from Agbóme, differing from his expectations in character, appearance, and even position. The grand imposing line looked from afar like colossal piles of ruins: a nearer view showed immense blocks, some of them 200 feet long, egg-shaped, and lying upon their sides. Nearly all the settlements had chosen the summits, doubtless for defence. Mr. Duncan crossed the whole breadth of these Kong Mountains, and pushed 100 miles beyond them over a level land which must shed to the Niger.

These descriptions denote a range of grey granite, the rock which forms the ground-floor of the Sierra Leone Peninsula and the Gold Coast, possibly varied by syenites and porphyries. It would probably contain, like the sea-subtending mountains of Midian, large veins of eminently metalliferous quartz, outcropping from the surface, and forming pear-shaped extensions of the reefs below. From the coast-line the land gradually up-slopes towards the spurs of the great dividing ridge; and thus we may fairly expect that, the further north we go, the richer will become the diggings.

The Kong Mountains are apparently cut through by the Niger south of Iddah, where the true coast begins. Travellers describe the features almost in the words of Clapperton and Duncan; the towering masses of

granite which contrast so strongly with the southern swamps; upstanding outcrops resembling cathedrals and castellations in ruins; boulders of enormous dimensions; pyramids a thousand feet high, and solitary cones which rise like giant ninepins. We know too little of the lands lying south-east of the confluence to determine the sequence of the chain, whose counterforts may give rise to the "Oil Rivers." It is not connected with the Peak of Camarones, round which Mr. Comber of the Baptist Mission travelled, and which he determined to be an isolated block. Further south the ghauts of Western Africa reappear in the Serra do Crystal, and fringe the mighty triangle below the equator. They are suspected to be auriferous in places. An American merchant on the Gaboon river, Captain Lawlin, carried home, in 1843-4, a quantity of granular gold brought to him by the country traders. He returned to his station, prepared to work the metals of the interior, but the people took the alarm, and he failed to find the spot.

Cameron and I, prevented by the late season of our landing from attempting the interesting exploration, were careful to make all manner of inquiries concerning the best *point de départ*; and, if fate prevent our attempting it, we shall be happy to see some more favoured traveller succeed. The easiest way would be to march upon Crockerville, two days by the Ancobra river and three by land. Thence bush-paths, which would require widening for hammocks, lead north through Wásá. There are many villages on the way; and, in places, provisions can be procured; the people are peaceful, and willing to show or to make the path. I consulted at Axim a native guide, who knew the Kong village but not the Kong Mountains. He made the distance six marches to Safwi, where the grass lands begin; and here he ascended a hillock, seeing nothing but prairies to the north. Eight more stages—a total of fourteen—led him to Gyáman, where he found horses and horsemen. He also knew by hearsay the western route viâ Apollonian Béin.

M. P. M. Lessar's Journey from Askabad to Sarakhs.

IN an earlier number of the 'Proceedings' (vol. iv. No. 4) some account was given of the new Russo-Persian frontier, which included a brief notice of a paper which M. Lessar had read to the Geographical Society of St. Petersburg on his survey operations for the proposed extension of the Trans-Caspian railroad. The last number of the *Izvestija* of the Russian Geographical Society contains M. Lessar's paper *in extenso*, and we are enabled to lay it before our readers:—*

In the middle of September 1881 the Trans-Caspian military railroad was completed from Mikhailof Bay to Kizil-arvat, and although no immediate extension of the line was contemplated, it was nevertheless

* For map consult 'Proceedings R.G.S.,' New Series, vol. iii. p. 576.

decided to make preliminary surveys to Askabad and then on to Sarakhs if circumstances would allow. A particular interest attached to that part of the line south-east of Askabad, as the levellings for a railroad would here be associated with the exploration of an almost unknown tract bordering on the new possessions of Russia; on the other hand, both the season of the year and the peaceful state of the steppe were favourable to the work. In pushing reconnaissances beyond the confines of Russian territory it is necessary to travel as lightly as possible, and it becomes very difficult to fit out an expedition with everything necessary to contend with all the privations of the steppe, with its extremes of heat and cold. The best season for work is September and October; the days are then cloudy, the heat is not excessive, and the men do not suffer. In those months rains are of rare occurrence, the streams and wells are short of water, and the pits dug to collect rain-water are nearly dry. Early spring is the rainy season, when the steppe may be crossed in all directions.

It was also most important to take advantage of the tranquil state of the country so as to avoid the necessity for a large escort with its incidental expenses. The capture of Geok-tepe produced so powerful an impression throughout Central Asia that even at the present time one may travel very considerable distances from the extreme points of the Russian dominions with a most insignificant force, but it is impossible to say how long this peaceful spirit may prevail, for in the steppe changes are sudden, and it frequently happens that some trifling occurrence rudely dispels the fancied security. For the survey to Sarakhs a covering party of twenty-one men with an officer was assigned, nine Russian labourers and two overseers were hired for the levelling and topographical work. The guide, Ana-geldi Sirdar, was a Tekke of Merv, enrolled in the militia of Askabad. He formerly lived at Merv, but having slain his man for some cause or other, he fled, and entered the Russian service. He had the reputation of being a brave man, a celebrated *batyr* or warrior, and a noted leader of *alamans*, besides being well acquainted with the road.

There were two interpreters: one a Kurd, who had been a prisoner at Merv and knew the Tekke language fluently; the other a soldier, Tartar by race, and a native of Kazan, whose dialect closely resembles that spoken by the Tekkes.

No difficulty was experienced in changing Russian money into Persian krans (worth about 40 copecks). The Persian merchants prize highly Russian bank-notes, and 100-rouble notes are current at Askabad at a premium of 2 and 3 per cent. The transport consisted of five camels, one waggon, and a small cart; one camel bore the instruments, two others the tents and effects of the labourers; and the remaining two my tent and baggage; the waggon was intended to carry the men to their work and back to camp in the evening, and for the sick if necessary.

The cart followed the surveying party the whole time bearing the box of instruments and the day's supply of water and food. The Cossacks had, moreover, four baggage horses.

The Cossacks and labourers were provided with French shelter tents (*tentes abris*), whilst for my own accommodation I took a field-tent, though its weight (7 poods = 252 lbs. English) and elaborate construction were great faults; but having regard to the necessity for plotting and reducing to scale at night the work done during the day, it is indispensable to have a good tent, and nothing better could be obtained on the spot.

The outfit at Askabad was most difficult: for necessary articles such as ropes, casks, water-skins, &c., were not to be purchased there and had to be obtained at the commissariat stores; whilst such things as could not be procured at these, had to be sought for in the *auls* or villages, which are generally badly off. Askabad has been very rapid in its growth; nearly all the soldiers are lodged in barracks, built of clay and unburnt bricks and roofed with reeds and clay; there are also many old houses. The bazaar occupies a long street, but the shops only contain manufactured articles, Persian and Tekke wearing apparel and provisions; the trade in brandy and wine is particularly brisk; everything else comes from Baku and Astrakhan.

The survey was commenced in the beginning of October. From Askabad to Annau the road is everywhere level, except for 600 yards at the tenth verst, where it passes over low sand-hillocks. Annau is an old half-ruined fortress on a hill, with an *aul* or village of felt tents two miles from the fort, which is surrounded by extensive ruins, and stands on the banks of a stream nearer the mountains. The inhabitants are but few, living mostly in tents. Annau is the first settlement, proceeding from Mikhailof Bay, where there are traces of art. These are in the ruins of a mosque; many of its towers have fallen, all the walls and arches are cracked, but the elaborate and graceful façade is still perfect. This building, for grandeur of design and elegant proportions, is in striking contrast with anything else met with in the Tekke steppes. As far as Gawars the Tekkes live mostly in *kebitkas* or felt tents. Between Bami and Askabad there are ruins of clay homesteads, but in small numbers; more frequent are the tombs built of unburnt brick, ugly, quadrangular buildings, surmounted by domes and plastered over with clay. At Durun and Parau (near Kizil-arvat) there are ruins of small mosques in a bad state of preservation; besides which on the banks of the Usboi (old channel of the Oxus) near Mala-kir (? Mulla-kari), Kara-durun and Aidin, parts of the walls of four monumental edifices are standing, but none of these possess any architectural interest. The inhabitants could tell us nothing of the history of the country; the nomads are comparatively new settlers, and apparently take little interest in all that happened before their time. To our question, by

whom was the mosque built and when? the inhabitants of Annau as well as other places, could give us no information; they only knew the mosque was erected in honour of some saint buried there; his tomb is undecorated, a mere mound of earth dressed with stone and surrounded by a stone wall, with a small entrance through which one has to crawl on all-fours. Near the mosque on the top of the hill a deep well has been dug to ensure a supply of water in the event of a siege. For half of the twenty versts distance from Annau to Gawars the road passes over a smooth, gradual slope, and at the tenth verst crosses sandhills which at this point closely approach the mountains. This is the only place along the whole line from Askabad to Sarakhs where some earth-works would have to be made for the construction of a railroad.

There are three fortifications at Gawars: the upper one is occupied by thirty Tekke families, living in mud hovels within the enclosure: in the central fort are forty of our *jigits* (native guides), whilst the lowest of the three is uninhabited and in ruins. During the continuance of our work between Askabad and Gawars we met caravans of Tekkes along the road, who were returning to Akhal from Merv and Tejend. These Tekkes fled thither during the war, but when Tekme Sirdar visited Merv, in July, they received from him such assurances as to their future lot as induced them to return to Akhal after gathering their spring-sown crops. They were in a wholly destitute condition, having lost nearly all their possessions, in many cases one camel sufficed to carry all the belongings of several families. They could not remain at Merv, and probably Tekme Sirdar had little difficulty in persuading them to return to their settlements; the refugees were badly received in the Merv oasis, for the Mervians are themselves badly off for land and water, and are seeking new places of settlement. The caravans from Merv took the direction of the Tejend, whence they turned into the desert and joined the high road to Askabad, near Gawars. This is the usual line of march of the Tekkes, for though the road nearer the mountains is better, it is open to attack from the side of Kalat and Daragez.

The distance from Gawars to Baba-durmaz is 36 versts (24 miles), over ground apparently quite level, but actually undulating with very gradual slopes, which form the first ascents to the mountains. Baba-durmaz is supplied with water from a stream flowing from the mountains. It is slightly brackish, though eagerly drunk by men and horses, and it serves to irrigate the small fields near the fortress. On our arrival at Baba-durmaz we found quite recently-abandoned works for the renovation of the half-ruined walls and towers of the fort; some dozen pieces of timber, unburnt bricks, and straw, littered the ground inside the walls and adjacent fields. The Ilkhani of Bujuurd, Yar-Mahomed-Khan, planned a restoration of the fortress to show his rights over Baba-durmaz; when information of this reached Teheran, the

reconstruction of the fort was forbidden, and the works had to be abandoned. In general the rulers of the feudatory provinces of Khorassan, when bold enough, are hostile to Russia. They, and only they, in Persia, are dissatisfied with the subjugation of the Akhal country and pacification of the steppe. At Teheran the Government is of course glad at the successes of Russia, because they are relieved of the trouble of fighting the Tekkes; as to the people, it is unnecessary to speak of them, there is hardly a village in Khorassan but has some peasants freed from Khiyan or Akhal-Tekke bondage by the Russians; and it is only since the capture of Geok-tepe that the people of Khorassan can count upon some degree of safety and tranquillity, for even the Mervians dare not maraud as formerly. The Ilkhani, on the contrary, are losers by the new state of affairs; they did not suffer from the Tekke raids—as with Persians so with Tekkes, the plunderers and plundered were distinct classes, the poor of both people were the sufferers, whilst sirdars and batyrs, no less than the Ilkhani, were enriched. This profitable source of income is stopped, as well as the importance of the Ilkhani as protectors of the empire, and probably no great time will elapse before the border provinces are placed on a level with the rest of Persia, and the Ilkhani deprived of their autonomy.

The road from Baba-durmaz continues over the same kind of country as before, thickly covered, however, here with bushes; the ground is so undermined with the holes of animals that both men and horses break through the surface at every step. Beginning at the tenth verst are mounds, ruins of forts and watch-towers. Here, as in the Akhal country, towers were till recently indispensable for each field; but at present raids have diminished, the towers are no longer repaired and are falling into decay under the wasting influence of the atmosphere, which soon converts these clay erections, unless constantly repaired, into shapeless heaps.

The whole distance from Baba-durmaz to Lutfabad is 22 versts (15 miles); at the tenth stands the small fortress of Artik, and beyond it as far as Lutfabad are cultivated fields, but the irrigating dykes are unbridged, and the bridges thrown across the streams in two places are out of repair, so as to necessitate a considerable *détour* to avoid them. On the Durungar, at its *débouchure* from Daragez, are four fortresses: Kaleh-mir, Shor-kala, Lutfabad, and Kiuren; the two farthest stand on hills, and are seen from afar, whilst the others are so densely enclosed with gardens as to be invisible 100 yards off. The inhabitants of Kiuren are Alieli Turkomans, whilst Shor-kala, Kaleh-mir, and Lutfabad are inhabited by Persians who lead sedentary lives. There are no felt tents here, all being housed in clay hovels inside the fortress, which is outwardly of the same appearance as those of the Tekkes, a regular square enclosed by a mud wall; within, on either side of the broad and only street, is a bazaar; out of which lead, in various direc-

tions, narrow, dirty side lanes, frequently opening into one another by gateways. The bazaar is, according to the notions of the people of the Atak, very rich, and certainly provisions and forage are plentiful; beyond this, the contents of every shop are the same: currants, nuts, several kinds of sweetmeats of very inferior quality, rice, sugar, execrable tea, Russian writing-paper; in bags hung on the walls are dye-stuffs for the hair and nails, medicines, amulets for men and horses, small trifles, mirrors, little flagons—all very roughly made, and evidently of Persian workmanship. There was a good gunsmith at the bazaar, who mended the broken handle of our measuring tape.

We stayed two days in Lutfabad; the second day the inhabitants had struck up quite a friendship with the labourers and Cossacks, exchanging visits like old acquaintances; jokes and laughter were the order of the day. The Russians entertained the Persians with tea, and these brought all they had for sale: guns, whips, provisions, kettles, sheepskins, &c. Of course the arrival of the Russians caused prices to rise, but nevertheless everything, especially provisions and forage, was much cheaper than at Askabad, which is not supplied by the natives, notwithstanding its being so near. This was at first explained by the circumstance that the khan forbids the export of produce, in order not to raise the prices at home; but afterwards they were more frank, and confessed the cause of the prohibition to be quite another: the khan prefers that the Russian Armenians should come to Daragez and buy on the spot. The khan waits till the contractor has given the people hand-money, and then places an embargo; this leads to negotiations, and the matter is eventually settled, but of course not without payment. On the other hand, the Persians are wanting in enterprise, because they know, strive how they may, they will never reap the fruits of their labour, their aga or khan will infallibly deprive them of their wealth.

The locality between Lutfabad and Kahka for 20 miles is the most fertile and highly cultivated part of the Atak; here water is abundant the whole way, and the population is as dense as in the Akhal country between Geok-tepe and Askabad. The fields extend in almost uninterrupted succession, streams and irrigating dykes constantly cross the road; progress, however, is much impeded by the want of bridges. North of the highway the whole country is thickly covered with reeds and bushes, and the farther from the mountains, the more luxuriant is the vegetation, to the very Tejend. The smoke which could be seen in the distance was caused by the burning of reeds and bushes along the Tejend, to prepare the ground for sowing. From Lutfabad to Kahka there are settlements the whole way, at first in single row, then in double, and afterwards in three lines; and besides the inhabited houses there are numerous ruins of abandoned forts, some directly on the plain, others on mounds of frequent occurrence between Kodja, Askabad, and Sarakhs. These are evidently thrown up by hand, and occupy perfectly

level sites, sloping on all sides towards the mound, probably for the reason that earth has been taken from the immediate vicinity to pile over them; they are mostly situated near streams and localities favourable for settlements, whilst they are less frequent between the forts. The opinion of Vambéry, that these mounds or burrows were raised by the Tekkes in modern times over the tombs of famous warriors and sirdars, is not confirmed; the Tekkes positively deny it; they point to the burial-places of their saints and heroes, of which there are occasionally a number on the summits of these barrows, the latter, they say, having been raised by unknown men long before their time.* They tell of a great general who, very long ago, wishing to leave a record of his numerous host, ordered each soldier to cast a cap-full of earth to form a great mound. This tradition is very widespread among the Tekkes, but to which mound it refers, and to what general, nobody can say. Some of the barrows are circular and others ellipsoidal in form, whilst a few are of more elaborate design. They are from 40 to 45 feet high and upwards, with a diameter not seldom of 350 feet, and steep sides. They remind one of the artificial mounds scattered over the central belt of North America, as described by Noddaillac. In the State of Ohio alone about 10,000 of them have been counted, and excavations fully explained their purpose, viz. to serve as burial-places of the prehistoric inhabitants of America. It is quite possible that the excavation of the mounds in the Tekke steppes would give like results, and that these barrows are the burial-places of tribes who occupied Central Asia long before the Tekkes, whilst these turn them to account for their own fortresses and burial-grounds.

A few versts from Lutfabad we were overtaken by an emissary of the elder of this village with a prohibition on behalf of the Ilkhani of Daragez, Alazar Khan, to continue work on Persian territory. This elder during the whole of our residence at Lutfabad tried to throw every obstacle in our way, and it is probable that the Ilkhani knew nothing of the prohibition; in any case it did not interfere with our work, for the right of Persia to the Atak is a doubtful point, and, moreover, the Persian Government did not oppose the Russian scientific explorations either in Atak or along the border provinces of Khorassan.

Between Lutfabad and Kahka we frequently met people, and ploughing operations were in full progress, in many places with horses, whereas in Akhal camels only are used for this purpose. Sportsmen too were numerous and game abundant, pheasants and prairie hens constantly springing from the bushes. The Tekkes did not avoid us, but entered into conversation and brought presents of what they shot. At Hodja-kala the whole male population came to look at us; nearly all sat down and gazed silently at our camp, whilst a few spoke with our guides and interpreters. Towards evening we bade them all withdraw

* See some account of these mounds in 'Proceedings R.G.S.,' New Series, vol. iii. No. 3, pp. 158 and 166.

and not approach during the night, for fear of misunderstandings, which they obeyed.

From Hodja-kala the ruins of Peshtak or Abiverd are visible as a confused mass, but on approaching more closely we saw that they covered a wide extent of ground, and were indeed the ruins of a whole town, though the buildings were of the usual construction and in no way remarkable.

From Peshtak to Kahka low scanty bushes are here and there seen by the roadside. Kahka, like most of the settlements, consists of a new inhabited fortress and old deserted ruins; the inhabitants upon every successive disaster that may befall their town never restore their former dwellings, but build a new fortress. Old Kahka stands on a low natural hill, on another height rising from its centre is an impregnable citadel; the whole shows the ravages of time, but still preserves an imposing appearance. New Kahka is the largest settlement along the line, and contains as many as 600 houses, though the elders boasted there were 1500. The population is composed of Alieli Turkomans who fled hither from Khiva after its capture by our troops; the new fort has already been built five years, the old one upwards of a hundred when the Alieli migrated to these parts from Khiva. Inside the fort the main street is occupied by a bazaar with nearly the same objects disposed for sale as at Lutfabad. This street divides the town into two parts, each of which is under its elder; that of the first half is Said-Nagar-yuz-bashi, a most skilful man, able to keep friends with everybody, and equally faithful to Persia as to Russia. The Alieli regard him as the representative of Persia, and he is extremely popular among them; the elder of the second part of the city is Un-Bagi-yuz-bashi, who received us in the presence of a great crowd, assuring us of his readiness to serve the distinguished travellers, and then afterwards at a private interview openly declared his fealty to Russia. Un-Bagi and his followers stated, without any reserve, that on migrating to the borders of Persia they were obliged to pay tithes, but now that the Russians had arrived they were very glad and hoped to be relieved from the Persian authorities. The relations of Persia to the Atak country are most peculiar; the Tekkes, badly off for water and land, are looking out for new lands, and are settling on the streams watering the Atak, after rising in the Allaho-akbar. As soon as the Akhal territory submitted the Persians grew much bolder, and insisted upon being paid tribute by the Tekkes, who had no choice but to yield, and purchase by this concession immunity from attacks and robbery by the Ilkhani; however, this tribute money is by no means a proof of a good title to the Atak, since the Persians dare not show their noses in the Tekke country for fear of being sold into slavery. At Kahka the news of an approaching alaman or raid of the Merv Tekkes was confirmed, and the whole settlement was on the *qui vive*; at night the cattle were driven inside the enclosure

and all the roads were watched. Under these circumstances we had to alter our *modus operandi*. As far as Gawars we had worked without the precaution of being guarded; between Gawars and Kahka five Cossacks accompanied the labourers, whilst the remainder escorted the baggage by the shortest cut from place to place, and then waited the arrival of the labourers at night. But from Kahka onwards, to guard against a surprise, we all marched together, the Cossacks never being more than a mile or a mile and a half from the working party, so as always to keep them in sight. This was, of course, heavy work for the escort, but considering the smallness of the force and the alarming rumours current, it would have been rash to separate.

Beyond Kahka we had to travel through a part very little known and not yet mapped. At first the road crosses a low spur of the mountains by easy gradients, after this three mounds are seen, and in their midst the abandoned fort of Kara-Khan, owned by one of the khans of Merv of that name; this fort is marked on the 20-verst map along the Sarakhs road, but it actually stands several versts to the north of the road. The map is generally inaccurate here, being founded on hearsay information, particularly in the direction of the road from Kahka to Sarakhs, which is represented on it as due east, the actual compass bearing being 55° , or south-east.

Nineteen versts from Kahka is the settlement of Hodja-med, inhabited by Tekkes; its fortifications are in ruins, and the water having ceased to flow within half a verst from it, the natives have moved nearer to the mountains, where they employ themselves with agriculture. Hodja-med lies low, and is not seen from a distance. A mile from it are the ruins of Sermechit, on a high mound, visible a long way off. The 20-verst stretch from Hodja-med to Dushak is absolutely level and open, Dushak being seen nearly the whole way. The ground is completely undermined by animals. To the south of Kahka are numerous large burrows of porcupines, and their quills litter all parts of the road. Two versts from Hodja-med the road passes close to a mound, and at the twelfth verst the ruins of a fort.

Dushak and Chardeh are made up of four forts placed close together: three to the south of the road on a smooth slope, and the fourth to the north of it on a high mound. Here we found only twelve Tekke families, the rest only appear at seed and harvest time. The fort stands on a stream which rises in the mountains of Kalat, and pours an impetuous torrent over a gravelly bed about 14 feet wide and 2 to 3 feet deep; the banks are also about 14 feet high, but shelving, and easily crossed. In the rainy season the river leaves its channel, though in the highest flood time it does not reach the Tejend. Besides Chardeh-tepe, on which stands the above-mentioned fort, there are several large mounds near Dushak, on one of which is buried a saint, after whom the mound takes its name, Magali-Ajidar-tepe.

From Dushak to the ruins of Mehana [Mehna], 40 versts, there is not a single rivulet or well, and a ravine situate about half-way only contains water after heavy rains. The nearest rivulet is 18 versts south of the road in the mountains. The ground is level throughout, and absolutely destitute of vegetation. The first cultivated fields are met with 5 versts from the ruins of Mehana, and extend the same distance beyond that place which comprises besides ruins the Tekke fortresses of Mehana and Emrali. The ruins of old Mehana occupy a considerable extent, and consist of the remains of various dwellings, a cemetery, and mosque; the latter may be seen half-way from Dushak. The new fortresses of Mehana and Emrali have a numerous population, the first about 100, and the second 150 houses. The Mehana rivulet is about the same size as that of Dushak. From the Mehana ruins to the new forts the road runs nearly due south, and then again turns south-east to fort Chacha, over ground similar to the preceding for 15 versts.

On leaving the mountains and approaching the Tejend we again entered impenetrable jungle and canebrake swarming with wild boar, pheasants, and game of all kinds, the pursuit of which forms one of the principal occupations of the inhabitants of Mehana.

The road to Chacha passes several mounds and two forts intersecting a line of abandoned kanats or irrigating dykes. Chacha is a small fortress, only some ruins of which remain. Here live about thirty families of Tekkes occupied in agriculture; most of the fields were sown with cotton. The Chacha flows between steep banks, and is 14 feet wide and 2 to 3 feet deep. Like the Dushak and Mehana, it also fails to reach the Tejend even at flood time. The best road from Sarakhs to Kalat crosses the Chacha and Karateken. That from Mash-had [Meshed] to Kalat via Allaho-akbar is impassable for vehicles, which have therefore to go round by way of Sarakhs and Karateken. From Chacha to Sarakhs the distance by road is 55 versts (33 miles) over level ground. Twenty and a half versts from Chacha is an artificial rain-water reservoir called Kel-gauz, now so covered with sand drift as to be nearly level with the banks; near it is a small mound formed by the ruins of a caravanserai that once stood here. Half-way, i. e. at the 28th verst, our route crossed that from Merv to Mash-had, which passes near Mount Khan-giren. From the 30th to the 36th verst the ground is covered with low hummocks of sandy argillaceous soil about 7 feet high. This locality goes by the name of Cherkezli; the bushes here are rarely taller than a man, and nowhere particularly thick. Our progress here became slow, entirely owing to the narrowness of the track, for the ground was compact and suitable for travelling. On leaving the hummocky tract we saw no more bushes and rank grass, and a prickly thorn covered the surface. Thirteen versts from Sarakhs the large mound of Kendekli stands to the right of the road.

Sarakhs is a large fortress, garrisoned by a battalion (700) of Persian infantry; within the enclosure are cultivated land and gardens.

The environs of Sarakhs were the continual scene of the exploits of the Merv Tekkes, and the Persians dare not show themselves outside the fortifications; when the commandant rides out 5 or 6 versts from the fort he takes an escort of at least fifty horsemen. The defences of the place consist of high thick walls and a deep ditch. Of course the Tekkes never attempted to take Sarakhs: there was no object in doing it, for the garrison were not in the slightest degree formidable to them, and never yet rescued a caravan which they pillaged within sight of the walls; the soldiers are so fearful of the Tekkes, that on the watch-towers, of which there are twenty-four in number, they light fires for fear of being left in the dark. There are six guns, but all of antiquated pattern, upwards of forty years old, and out of order; the gunners are ignorant of their use, and never practise firing, nor has there been an instance since the date of the erection of the fort of their having been let off.

The channel of the Tejend at Sarakhs, or the Sarakhs-daria, is dry most of the year; it is a quarter to three-quarters of a verst wide, and even more in places. At our crossing-place, marks of where the water had been were visible on all sides, but actual water only makes its appearance at Sarakhs after unusually heavy rains, or when the snow melts in the mountains. At such times the water flows down the lower Tejend, north of Sarakhs, and fills artificially-constructed lakes, made by means of dams, in order to collect water for irrigating purposes, and enable the Merv Tekkes, who nomadise to this place, to cultivate their land. Sarakhs derives its water supply (1) from wells inside the fortress at a depth of 20 feet, which is also the depth at which water is obtained on the other side of the Tejend, so that supposing it were necessary in making the railroad to circumvent the Persian fortress of Sarakhs, want of water would be no obstacle; and (2) from a canal 14 versts long led from parts of the Tejend which always contain water; for this purpose dams have been built 16 versts from Daulat-abad to divert water into the dyke, by which means it reaches Kalehnau and Sarakhs.

The levels taken for the railroad have served also for the general topographical survey of the ground from the Caspian inland, and have especially demonstrated the absence of any general rise along the whole distance surveyed. At Aidin many points were below the level of the Caspian; and the whole tract from the sea to these wells cannot by any means be identified as a river channel, but proves to be a desiccated gulf of the sea, the part nearest to the shore being covered with sand-drift, and the land gradually rising to the level of the surrounding country, owing to the filling of the lower parts by a disintegration of the Great and Lesser Balkans. From Aidin the line

runs along the slope of the mountains, ascending or descending as it approaches or recedes from them. But there is no general rise from the Caspian. Judging from the nature of the ground, it is very probable that when levelling operations come to be made from the Tekke oasis to Khiva and Bokhara, it will be found that in the midst of the sandy steppes intervening between these countries there will be many tracts below the present level of the Caspian, for instance, the Sara-Kamish basin. Our levelling further proved that it was impossible for the Murghab and Tejend to flow into the Oxus, as some even now suppose to have been the case, and, moreover, that these rivers had an independent course to the Caspian when this sea was nearer to them. Further levellings, combined with geological researches, will explain the meaning of the hollows met with in various parts of the steppe, and at the present time supposed to be old river-beds.

The expedition returned to Askabad via Ak-darband, Mash-had, Allaho-akbar Pass, and Mahomadabad. There are two routes from Sarakhs to Mash-had: the first and most frequented crosses the Muzderan mountains, and is comparatively secure. This road has been widened, but is difficult for carts. The other follows the Hari-rud and Keshef-rud, and has not been widened, but might easily be made practicable for wheeled traffic, as there are no great heights close to the river. At present it is available for pack trains, but slight alterations would convert it into an admirable carriage-road.

This road is at present hardly used, owing to the danger of travelling along it; only at Daulatabad and Ak-darband are Persian garrisons of ten men stationed, but of course they do not make the road secure, and are themselves afraid to venture outside the fort. All the way from Sarakhs to Shadichah there is not a single village; traces of irrigation works, deserted fields, mills, cisterns, are plentiful, but nobody ventures to live here, because this was the line of march usually taken by the Tekkes in their marauding excursions into Persia, and they often reached Mash-had by this way. On the summits of the highest hills may be seen the ruins of towers which were useful in watching the bands of Tekkes who might slip through the side valleys and so reach Mash-had. These towers were provisioned every two or three months, and the duty of the watchmen consisted in signalling from tower to tower the movements of the robbers. This watch on the roads is now discontinued, owing to the diminution of the forays, particularly since the fall of Geok-tepe. "The Russian Emperor," say the Persians, "has said that we shall not be robbed." At Bakhbagi, between Sarakhs and Shadichah, thirty families of Salors, refugees from Merv, have lately settled. They were so poor that the Persian Government had to supply them with bread, and of course they have nothing to fear from the robbers; whilst the Persians are glad to receive any settlers on their borders.

From Shadichah to Mash-had the settlements become more and more

numerous; both sides of the road are cultivated as far as the eye can see; innumerable canals and kanats supply the fields with water from the mountains. The country is rich and fertile, though at present the inhabitants only raise crops of bread-stuff—wheat, barley, &c. This is owing to the want of means of communication; there is next to no trade, and wants are very limited, owing to the difficulty of supplying them. But a brisk trade is springing up with Askabad, though it is prevented from developing rapidly owing to the want of a good road across the mountains dividing Khorassan from the Atak. The pass over this range is at present impracticable for wheeled traffic for 20 versts from the village of Towarik via Derbendi to Ak-dasha, and even horses and pack-camels can with difficulty make their way across; the transport is mostly accomplished by mules and donkeys. Under these circumstances a large trade cannot be maintained. The road might be made serviceable, for, with the exception of these 20 versts, it is good. From Mash-had to Towarik the ground is level, and the soil favourable for travel. Here it would only be necessary to widen the bridges across the irrigating dykes, which are all adapted for pack animals, the fords not being all practicable; from Ak-dasha to Askabad via Nonhandan and Kalta-chinar the road might be easily made thoroughly serviceable.

GEOGRAPHICAL NOTES.

The "Eira" Search and Relief Expedition.—Sir Allan Young telegraphed from Honningsvaag, 60 miles east of Hammerfest, that he was just leaving for Novaya Zemlya. He had purchased at Hammerfest a second vessel, a walrus-hunter's schooner, which he intends to employ in cruising on the west coast of Novaya Zemlya, whilst he makes an attempt in the *Hope* to reach Franz-Josef Land.*

Ice in the European Arctic Seas.—We hear from Tromsø and Hammerfest that during June the ice was low down to the eastward of Bear Island, but that Spitzbergen was open, while the Austrians found ice extending 100 miles from Jan Mayen Island. Captain Fjelde, of the Norwegian sloop *Hasbroen*, reports from Adlesund that he was off the east coast of Iceland for fourteen days in the same month without being able to get near it. He saw several vessels in the ice, which extended about 60 miles from the coast, and considered that they would have great difficulty in getting out without damage. It is feared that some of them were wrecked in a heavy north-easterly gale on the 23rd of June. Several steamers bound to Iceland have returned to Norway, having been unable to reach their destination; and there is great distress among

* The list of the crew given in the 'Proceedings,' *ante*, p. 420, is that of the *Eira*, not of the *Hope*, the officers only being those of the *Hope*; the name of the third officer on the list should be Lieutenant P. Bairnsfather, R.N.

the Icelanders, many of their sheep and horses having died for want of fodder. Outside the ice the cod-fishing has been very good.

Lieutenant Hovgaard's Expedition.—The *Dijmphna*, with the expedition of Lieutenant Hovgaard on board, sailed from Copenhagen on the 18th of July. We learn from our correspondent, Admiral Irminger, that it is the intention of the gallant young naval officer to adhere to the programme originally announced, viz. to proceed first to Cape Chelyuskin and thence make for Franz-Josef Land, pushing for the north next spring in sledges. His ship of 150 tons burden has been strengthened for the ice both inside and out. He has provisions for twenty-seven months and coals for fifty days with full steam at six knots; besides which he has rigged the vessel as a three-mast schooner, with square sails on her fore-mast. He takes several sledges and nine dogs of a Newfoundland breed. The expedition consists, besides the commander, of Lieutenants Olsen and Parde of the Danish, and Lieutenant de Rensis of the Italian, Navy, Dr. Barch as surgeon and botanist, and Mr. Holm as zoologist, Mr. Litonius (Swede), engineer, and Mr. Ernst, mate, besides a crew of fifteen men, one of whom, the Norwegian Sivertsen, was in the *Vega* expedition.—Further information regarding the chief objects of the expedition is contained in a statement issued by Lieutenant Hovgaard himself. They are to ascertain whether Franz-Josef Land really extends to the neighbourhood of Cape Chelyuskin, whether the conditions of the current and ice are such that a basis for further exploration can be reached here without too great a risk, and whether the eastern coast of Franz-Josef Land trends to the northward at this point. He proposes to winter near Cape Chelyuskin, or on the south coast of Franz-Josef Land, if it can be reached, and he hopes to return within sixteen months. Observations will be taken throughout the winter in accordance with the programme of the International expeditions.

Polar Meteorological Expeditions.—The *Pola** has again sailed from Tromsø to endeavour to land the Austrian expedition on Jan Mayen Island; and the Swedish gunboats *Urd* and *Verdande*, under the command of Captain Palander, left Bergen with the Swedish expedition on the 3rd of July. The steamer *Varna*, with the Dutch expedition on board, left Amsterdam for Dickson's Havn on the 5th of July.

Trade with Siberia.—In spite of the loss *M. Sibiriakof* sustained through the loss of the *Oscar Dickson*, he has decided to make another attempt at opening up trade with Siberia via the river Yenisei, to which end his representative in Gothenburg, Captain Appelberg, has received orders to equip and load his second steamer the *Nordenskjöld*, and as quickly as possible despatch her to the Yenisei. The vessel, which carries chiefly English merchandise, will winter at Kureika, and

* See *ante*, p. 423.

return next year with a cargo of Asiatic produce; she will be commanded by Captain Johannesen, who had charge of the *Lena* on the Vega expedition. Another vessel, the *Diana*, will also be despatched from Tromsø to the Samoyede village at Jugor Shar with a cargo of merchandise, which will thence be freighted on reindeer to Obdorsk, and the *Louise* will be sent from Bremen to the Kara Sea. Besides these there will be two more steamers in these waters this summer, viz. the *Norna* with the Dutch circumpolar party bound for Port Dickson on board, and the *Dijmphna* with Lieutenant Hovgaard, who accompanies the former vessel as far as this port. All these will, of course, be on the look-out for the *Eira*.

Further News from Lake Nyassa.—We have received, from Dr. George Smith, the following interesting items of news in continuation of the paragraph relating to Lake Nyassa in our July number; the information is contained in a letter from Dr. Laws, dated Bandawe, April 5th, 1882:—Mr. James Stewart has completed his survey of the east coast of the lake, from Chitesi's southwards to Livingstonia, and has now started to complete its northern section. When he reaches the northern end of the lake he will learn the state of the country, and, if all is well, will as soon as possible resume his interrupted work on the road towards Tanganyika. He is in good health again. It is reported that the Portuguese intend to occupy militarily one or two points on the Upper Shiré and possibly also on Lake Nyassa. An expedition for this purpose is to start possibly in April or May, under the command of the Secretary-General of Mozambique. This information comes from a reliable source at Mozambique. How far the Portuguese may be able to carry out their programme remains to be seen, but fears are expressed that hostile encounters with the natives will ensue if they attempt it. Peace, or at least a truce for a time, has taken place between the Angoni (Mangone) and the Atonga. Slave-traders are busy, however, and by working on the Atonga have induced them to make two raids on some of the outlying hill villages. Mombera, the chief, has sent two messengers to Dr. Laws, and he intends to start along with William Koyi to visit him, and see what can be done towards obtaining permission to found a station among the Angoni, and leaving William Koyi there to begin work.

REPORT OF THE EVENING MEETINGS, SESSION 1881-2

Fourteenth Meeting, 26th June, 1882.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—Lieutenant Chas. Andrew Rouse Boughton-Knight; John Borwick, Esq.; H. St. John Browne, Esq.; Edward Seymour Cooper, Esq.; [The Rev. W. Deans Cowan; Commander Malcolm Hugh Drummond, R.N.; John Geddie,

Esq.; John H. Gubbins, Esq.; S. C. Hadley, Esq.; C. Maigatter, Esq.; H. F. L. Melladow, Esq.; Henry Moss, Esq.; Captain Isaac Reeves; Wm. H. Adderley Sleigh, Esq.; Sydney Chas. Tompkins, Esq.

On opening the proceedings,

The PRESIDENT announced that the Council had decided on equipping an expedition to Eastern Africa, under Mr. Joseph Thomson, for the exploration of the snow-capped mountains of Kilimanjaro and Kenia, and the country between those mountains and the eastern shores of the Victoria Nyauza.

He then stated that the subjects of the evening were, first, a description of a sketch survey of the Ancobra and Prince's Rivers, on the Gold Coast, by Commander Cameron; and, secondly, a paper on "The Kong Mountains," by Captain Barton. It was unnecessary for him to introduce those gentlemen to the Meeting, as their names and deeds were quite familiar to them. All who had read the account of Commander Cameron's journey through Central Africa from one sea to the other must have admired the heroism and endurance which he displayed; recently he had been interesting himself in the region which he was about to describe. The name of Captain Burton was a household word with all who honoured British enterprise, courage, and ability. His career had been one of the most marvellous among those of British travellers. It began in his early youth, when he was an officer in the Army in Western India. Afterwards he became celebrated for his travels in Arabia; then in the Somali Land, and in Syria; he had also visited the Salt Lake of North America, and Central Brazil. But perhaps the journey in which the people of England took the greatest interest was the expedition between the years 1857 and 1859, in which he made new and important discoveries in Central Africa, and, in fact, first made Lake Tanganyika known to Europe. The region he was about to describe was well known to him twenty years ago, when he was Consul at Fernando Po, and visited the capital of Dahomey, and wrote a description of his journey. Though any introduction of such a traveller was unnecessary, he (the President) felt it impossible to deny himself the gratification of recalling the many and wonderful feats that had been performed by Captain Burton's enterprise and courage.

A Sketch Survey of the Ancobra and Prince's Rivers, and of the Takwa Range, Gold Coast.

Commander CAMERON said that the district about which he had to address them was very small in extent; but it was one which would always be affectionately remembered by him, because it was there that he first travelled in company with the most cordial companion and the best traveller of this age—Richard Burton. The map on the screen, he would explain to the Meeting, was an enlargement made by the Society's draughtsman of his own Sketch Survey. After the usual tedious voyage from Liverpool in an ordinary steamer, fitted more for the transport of palm-oil than passengers, and after touching at Cape Palmas and other places further west, Captain Burton and himself sighted the whitewashed port of St. Antony at Axim. They had to lie a long way outside, where they could scarcely see the beach, owing to the dread of the Hoeven rock, which, though known for many years, was incorrectly laid down in the Admiralty Charts. 150 steamers passed it yearly; but they all had to anchor off in six fathoms at low tide for fear of that rock. He fixed the position of the rock much nearer in than was laid down on the chart. Axim was well known by the descriptions of Bosjmann and others. The Dutch took it from the Portuguese early in the seventeenth century; De Ruyter placed his battery so as to command the Fort of St. Antony and

captured the place. According to Bosjmann it was always of value and importance for the export of gold. Although during the last century the whole coast usually exported 3,500,000*l.* annually, in the year 1700 nearly 3,000,000*l.* were exported from the little port of Axim alone. The place had since been somewhat forgotten; but the fact which he had just mentioned showed of what value that small tract might be hereafter. Landing at Axim, their first idea was to go towards the Kong Mountains; but, as they were too late in the season, they had to forego that intention. Their first journey was from Axim across the Ancobra river and along the beach to Atabu, the capital of King Blay, who during the Ashanti war was one of our staunchest allies. He fixed himself on a little peninsula and palisaded himself and held out for the British against all the neighbouring natives. At Atabu they were received by the king with all possible honours. The streets were draped with English flags, Union Jacks, or imitations of them, flags of various colours—orange, brown, green, red; and King Blay himself was dressed in his high fetish robes. The name Atabu was derived from that of a tree which was very common in that region. A short way from Atabu was Béin, which was the old English fort on that coast. Behind Béin lay an open savannah which in the rainy season became a swamp. Above that was a sort of lake, from which the Lagoon river made its way down to the sea. On the lake is a very curious village, for a description of which he was indebted to Mr. McCarthy, of the School of Mines, who went up some distance to the smaller rivers beyond. According to his description the village was very similar to the lake village that he (Commander Cameron) saw in Lake Mohrya in Central Africa. There was a platform with canoes stowed under and the nets hanging up to dry. Very little ivory at the present time came down to the Gold Coast, the people being satisfied with the small gains they made from gold; but Mr. McCarthy going up one of the streamlets which he had found navigable for canoes, saw the skull of a young elephant which had been recently killed; and he was told that at a short distance in the interior, elephants were by no means uncommon. At Béin they found traces of the bombardment sustained during the Ashanti war. Whilst brave old King Blay was defending himself there, the town was occupied by the tribes around, as was also Axim, with the exception of the fort. Those tribes were formerly under the Dutch régime, and therefore had always been friends with the Ashantis. Captain Burton and himself saw several marks in the walls of the old fort of the seven-inch shot fired by the gunboat; but the fort could by no means be called a ruin, and the agents of Messrs. Swanzy had a very comfortable house made out of part of the building, with stores underneath. From an account of an American voyage to the coast in 1840, it appeared that the king of Apollonia was able to entertain his people on gold plate, and to have champagne and every other luxury. That, however, was in the old slavery days. Since slavery had been abolished the king had become much poorer. If he had had the gold plate he would certainly have brought it out in honour of Captain Burton and himself; but instead of that, for his loyalty to the English Government, he now possessed a general's sword and an Ashanti medal. After this visit he and Captain Burton journeyed back along the coast to Kabeku, which was built by a man one of whose sons built Béin and the other Atabu. After many generations a division took place: Atabu became the capital of Eastern Apollonia and Béin the capital of Western Apollonia. From that district they went past Anochi, Beku, and Nalochi to Nanipoli: then northwards across a savannah, across the Ebumesu and by Benya and Arobu to the village of Arobukam, the name of which meant one stone on the top of another. Close to that there had been many native diggings, and it was one of the places at which there was an English mine. The country was undoubtedly rich; but its actual value had yet to be proved. They then

worked back by Matinga, crossing the double river Fia by the village of Ashan Kru. They saw many quartz reefs, and came again down to the mouth of the Panalyon. The beach there was very curious, consisting of an enormous amount of comminuted shells. That beach ran to a certain extent outside the small lagoon, and the great supply of lime for the country came from there. A big palm-oil cask of lime cost there four or five shillings. The river was marked on the map as the river Lagoon. At one time east of this place there was a lagoon; and there was still at the present moment a lagoon under the surface, for as they walked along the beach after the tide had ebbed, they could see the water oozing out; the water that had percolated in being again filtered out. They spent one night at Esrimennu and went about the lagoon there, noticing that branches of the lagoons extended in different directions, and that there were traces of its being connected probably in the rainy season with the other lagoon and the river Ancobra. From Esrimennu he went to Nyoku. They crossed some small hills which were all running in the same meridional direction, and returned across the Ancobra to Axim. The next expedition was intended to be down to Prince's River, and in preparing for it their troubles began again. One night they engaged a boat, but the next morning, about six o'clock, when Captain Burton asked if it was ready, he was told that it had gone up to Alabu. They then got another boat, and a boat's crew; but they had no paddles. They had to hunt up every hut in the town before they could get a paddle; and so, instead of starting at six o'clock in the morning, they did not start until two o'clock in the afternoon. They worked their way down to the mouth of Prince's River. In the dry season that river was merely a narrow gulf, and an ordinary hunter could jump across the mouth; but there were two parallel reefs outside, which might be made into piers, and so a capital landing place be formed. They ran their boat on to the beach, and dragged her over the sands. Then they walked to an old fort called Brandenburg. Some difference of opinion existed as to who founded the fort, but it was most probable that it was built by the old Brandenburgers. It was one of the best he had seen on the coast; and, except the roofs and the woodwork, was in perfect preservation. Being situated on a knoll projecting far out into the sea it formed a most charming place. They obtained a guide, and worked up the Prince's Lagoon river. Having done eight miles in four hours, they found themselves still two miles from Prince's, as the river in some cases swept round at an angle of 170° . Then landed at Bekaye, passed Malochi, and then went up the river, still finding the parallel hills running on both sides to the village of Kumasi. Here again they found that nature had done everything, and that it was only left for man to complete the work necessary for mining. At Enima Kru, where they stayed two days, they were rather amused at the way in which the chief behaved: he was not too proud to carry their guns, or for them to live in his house; and anything they fancied he was only too delighted to sell to them. After they had returned again to Axim they undertook a short journey to a place called Apatim, a mining village close to the coast, from the top of the hill at which place they could see Axim. At night, when he (Commander Cameron) was taking his observations for latitude and longitude, the old chief sat near him, making fetish against him; but he was not able to prevent him making his observations. After that they started to go up the Ancobra, sleeping the first night at Kumgrasi, where there was an old fort called Elise Carthage. Up to the Devil's Dyke the river was navigable at the lowest time of the year for any vessel drawing six feet of water. They then worked up the river till they came to Namwa. There they landed, and went up some little distance to Ingobin. All along the hills were found to trend in the same direction as before, the bottoms being filled up by mangroves. After spending two days there, they continued up the Ancobra and

passed the Ahema river, and found it open for boats. The banks on either side were dotted with temporary villages, some for palm-wine, others for palm-oil, and some for rice crops, while others were landing places. They had the advantage of finding the river at its lowest. As they proceeded they left the thick mangrove swamps, and came to others which were overgrown chiefly with the bamboo palm. This tree, of which the houses were mostly built, was used on the west and south coast of Africa for hammock piles; and, somehow or other, had come to be called the bamboo. Proceeding still further up, they came to a silver mine. It was not the only silver mine in the country, for there were three others, and there were traces of silver in most of the gold-mining districts.

Commander CAMERON then described his sketch of the quartz reef at Akankon. The highest point above what he took as his datum level on his former journey was about 140 feet; but this year he found the river four or five feet lower. Some of the reefs were more horizontal, and in some cases very nearly vertical, but they mostly ran in the direction he had indicated. There were several rich reefs there, and great quantities of gold in them. The water being low, they could see the banks on either side, and all the formations. On the top there was vegetable humus; below that ordinarily a red clay, or sometimes gravel; underneath that conglomerates and breccias lying in the anticlinal curves of slate, the slate in some cases being immature clay slate, in others a slate formed of volcanic debris. Underneath this was the true rock of the country, which was usually granite. In some places along the banks the water was so low that the women were taking out the stuff in pits, standing up to their waists in water, loading it in canoes, and sending it away to their huts to be washed for gold. Next day they came to a village called Enframaji, just below the Devil's Dyke, which for all ordinary purposes he considered to be the terminus of river navigation. Last year he found that a launch could not steam beyond it on account of the current, and this year on account of the draught of water. The Devil's Dyke was a great reef of slate across the river, and even with a surf boat or canoe in the dry season there was a great difficulty in passing it. They then proceeded to Tumentu, which was a great depôt for the various mining companies. Both Captain Burton and himself became unwell there, and were compelled to return to the coast. They had been advising everybody not to do too much, but, somehow or other, while giving advice was easy, following it was rather more difficult. After a week or ten days at Axim he went up the river again to the central depôt, and then by the Fura river, which was rather an important affluent of the Ancobra, leading through what should be a very rich mining country to Iniamankao. Returning to the junction of the Fura and the Ancobra, he went up as far as the Butabue rocks, which was the farthest point of navigation for boats or canoes. There were reaches farther up; but for all navigable purposes the river was there completely closed. He then came back to Tumentu, and went across by land to Ashan Kru, where there was another great depôt of the different mining companies. The next day, passing along the Aunabe river, he worked over to Belle Vue, which was on the top of Tebribi Hill, 285 feet above the sea. From there he had a fair view over the surrounding country, and saw hill after hill, all in the same parallel direction. He got up there in the middle of a tornado, and for half an hour was drenched through, but when the sun shone out afterwards the effects of light and shade, and the rising of the mists in the valley, were most beautiful. This hill seemed to be a commencement of the formation of the Tarkwa range, on which there were at present no less than four companies registered and working to a greater or less degree. He then went on to the residence of the Government Commissioner of Takwa, a house variously named Mount Pleasant, Prospect House, and Vinegar Hill. At the Effuenta mine just opposite he was most hospitably received. He stopped two or three days looking at

the works. Then he walked up along the Takwa range and stopped for a certain time at the town of Takwa, which was a most amusing place. Every house was a shebeen: the gaudy handkerchief, the delight of every negress, was displayed in every window, or if not in the window, was hung on the line: for the dandy there was pomatum with the vilest of scents, for the poor man tallow; and the powder which was intended for the blasting of the mines was exchanged for what would blast more surely still—African rum. In close proximity to Takwa was the African Gold Coast Mining Company, the oldest company in the district. The mine was opened, but the machinery was not in good order. The proximity of Takwa must be a great drawback to it, for in that town last year there were a considerable number of blackguards, but this year he thought there were at least four times as many. The Houssa and Fanti policemen held high revelry there, and so did their prisoners. The poor unfortunate commissioner had only a bamboo hut for a prison, and nothing to tie the prisoners up with, so that when a man was shut in for the night he would cut through and escape before the morning. Perhaps if they borrowed the shaft of a mine and let the prisoner down there, and hauled him up when they wanted him, they might be able to confine him, otherwise he did not see how they could do so. He passed on until he came to the town of Abosu. Last year, when he was there, he did not think there were more than three or four hundred people in it, but this year a rush had been made, and in the early part there were over ten thousand people working gold there. When he visited the place there must have been between seven and eight thousand. The rains were beginning, and they could no longer work in the low levels, so they were going away again. It was a combination of the civilisation of Sierra Leone and of Cape Coast. It was a most extraordinary sight to see such a number of usually apathetic people at work. Making allowance for being in Africa, it was quite equal to any rush that had taken place in Australia or California. Taking into consideration the difficulties of communication, transport, and everything of that sort, it was simply wonderful. Passing through Abosu it was pleasant to come upon a trace of real civilisation. Messrs. Swanzy were almost the oldest, and certainly were the best known merchants on the west coast of Africa. At Crockerville, called after the working partner there, they had established mines, set up stamps, and had actually tested what they had done. Then coming back he had passed by Abo Yao, where the French Company of the Mines d'Or d'Abom had their headquarters. There was no machinery there, but the tunnels were opened in a proper and workmanlike manner. He then returned to Axim. His conclusions regarding the configuration of this coast country were that the whole of the coast was in a former geological period an archipelago; the parallel hills lay off the coast of an old country, and between the hills there ran rivers and rivulets. The sea worked up between them once, but gradually the silt filled up the spaces between; the mangroves grew there, and there had also been a gradual upheaval. The decaying silt brought down from the interior was intercepted by the roots of the mangroves, and thus the level of the country was raised. Precisely the same thing was going on at the present day close to the coast. Some day or other all those parts which were now lagoons and swamps would be filled up, just as the spaces between the hills were at present. The highest point he reached in his journey was 310 feet, on the top of Abo Yao, at the house of the manager of the mines there.

Captain BURTON: Allow me to add a few words upon the way in which the map exhibited has been made. Commander Cameron was always up the first thing in the morning making his collections of natural history and ethnology. During the day he disdained the hammock and walked on foot, holding his compass in his hand; in the evening he was out again collecting specimens, and sat up to nearly mid-

night making his observations, and if those observations did not please him he made them a second time. That is the way in which good travellers work. I think I remember Shakespeare saying something like "Perseverance, good my lord, makes honour bright," and perseverance is Commander Cameron's great quality. I will offer another remark about the map. You observe the extremely regular form of these hills. In all other maps of the country they are disposed in every possible direction, one to the north-west, one to the north-east, another to the north, and so on. The extreme regularity of the hills has a practical bearing upon the gold production. They are hummocks, each containing one or more auriferous quartz reefs; and only in two cases did Commander Cameron find an exception to the general rule of north with a little easting. That is a most important point, because you see at once a cross-cut will strike your vein, whereas if the hills were in all directions you would have absolutely no rule for mining. I will not repeat to you what I said before the Society of Arts, but I must warn you that the Gold Coast contains many other productions besides gold. I believe it is an acknowledged rule in mineralogy that there is no gold without silver, and the Gold Coast contains silver mines of which the old Hollanders worked four. Even in 1880 63,337. worth of silver was exported. Manganese was found in the mine at Akankon, and here also Commander Cameron came upon a large vein of cinnabar, from which, by means of a blow-pipe, he extracted mercury. I have seen copper and specimens of tin containing from 10 to 10½ per cent., whereas in England from 2 to 2½ per cent. is considered well worth working. East of Assinie there are natural wells of petroleum, bitumen, and liquid pitch. I expect the list of precious stones will be a long one. The aspect of the country is diamantiferous, for one crystal found was pronounced by a professional mineralogist to be a diamond.

Captain BURTON then read a paper, entitled "The Kong Mountains." (*Ante*, p. 484.)

Mr. GALTON asked what was the extent of country over which gold-dust was used as an article of barter. A knowledge of that fact would, perhaps, give a good idea of the extent of African soil from which gold was obtained. He was surprised to see the large number of names on the map. There appeared to be about one village to each mile. If the villages consisted of many houses, there would seem to be a very considerable population.

Commander CAMERON replied that from the Gambia down to the Volta river, gold-dust was an important article of commerce, and a great deal of gold also went to Timbuktú, and found its way up to Morocco and the Mediterranean coast. He believed that the whole range of what was supposed to be the Kong Mountains was a matrix of gold. Of course that was only theory; but all along the coast gold was used in barter. With regard to the population, while the mining regions contained a considerable number of villages, most of them consisted only of three or four huts. Since the abolition of the slave trade, so much mining had been given up that the population of the country had marvellously decreased. In the dry season the people lived in some of the villages in order to raise their rice and other crops, and to collect palm wine and palm oil, but in the rainy season they went up higher. There could be no doubt that slavery was to some extent ingrained in the African mind. The African as a rule was thriftless, his great idea being not to be a day labourer, but a merchant or a lawyer. He considered it more or less a dishonour to work with his hands. In the days when there was slavery they were forced to work, and the country was largely cultivated. The question of labour would be one of the difficulties on the Gold Coast, but the solution was easy. China was supplying labour to the whole world. They were at work on the railway which it was intended should ultimately reach Timbuktú; they were employed in British Columbia on the Pacific Railway, and in the greatest mine in South America, the San João del Rey,

which was worked under almost the same climatic conditions as on the Gold Coast. Captain Burton and himself had been regarded as visionaries, looking too far ahead ; but it was better to provide in advance against an evil than to have to deal with one ; and he believed that the Chinese labourer would prove a great blessing to Africa, and that the Gambia would become one of the finest rice-growing countries in the world ; so that, instead of Chinese rice being imported, it would be exported from there. The Fanti would work fairly well for a time, but after two or three weeks he wanted to go home to his wife, and have a bottle of trade gin. At present there was no difficulty about labour, but with the multiplication of the mines there would be a great difficulty. The tension had already begun to tell on the oil rivers. The French experiment with Chinese labour in Senegal had succeeded perfectly as far as he had heard.

Captain BURTON added that gold-dust was the only currency known to that part of Africa. The natives had the most complicated divisions of it, and could pay a man the value of a farthing in gold-dust.

Sir SAMUEL ROWE (Governor of the Gold Coast Colony) said that he could endorse all that Captain Burton and Commander Cameron had said with regard to the presence of gold in the country. He had the pleasure of being acquainted with both those gentlemen. Many years ago he met Captain Burton in West Africa when he was about to travel to Dahomey. There could be no doubt that there was plenty of gold to be had, but the question was, would the difficulties of the country allow us to obtain it in such quantities and at such a price as to make it remunerative? Any person who would take the trouble to wash the sands would be able to get gold, at Cape Coast, at Axim, or at Elmina. On a rainy day at the headquarters of the police at Elmina the men were anxious to be relieved from parade in order that they might walk up and down to pick up gold. The Gold Coast was a rich country in many ways. Palm oil was the export of greatest importance which found its way to Europe. It was an unhealthy country, but the scheme for bringing Chinese labour there might perhaps make a difference. Everything that the Government could do to develop the industry of the country and encourage mining operations would be most willingly done, and to a certain extent had been done.

Mr. JOHNS informed the Meeting that a competent engineer had been sent out to make a survey for a light railway through the district. He was glad to hear from Sir Samuel Rowe that the Government would be prepared to consider such matters favourably. It was thought that a light railway which could take machinery to the mines would be one of the greatest civilisers ever known there, not excluding even missionaries.

The PRESIDENT, in proposing a vote of thanks to Commander Cameron and Captain Burton for the interesting accounts they had given of a region which was at present attracting public attention, said it seemed that the district had not got its name in vain ; and that the wealth for which it was once famous would probably be again developed. The interest of the Society, however, was not so much in the commerce and produce as in the geography. It had been often said of late that they could not now look for the discovery of fresh regions, but must be content with obtaining a more complete knowledge of those which were already partially known. It seemed, however, that between the sea and the banks of the Niger there was a considerable mountain district which was but very little known. Captain Burton had indicated the sources from which he had drawn his information as to the Kong region, but he would be the first to admit that a great deal yet remained to be learned with regard to it. In a very short time the Mountains of Kong, like other mountains, would be no longer a mystery, and he should not be surprised if the travellers to make them known were Captain Burton and Commander Cameron.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—June 16th, 1882: M. Henri Duveyrier, President of the Central Commission, in the Chair.—The Chairman communicated to the Meeting the mournful intelligence published by a morning journal, and reproduced by the evening papers, of the death of Dr. Crevaux, who was engaged on an expedition in South America. He added that the Society would take all possible measures for ascertaining if the news were true, and the circumstances attending the catastrophe. He said that it was between Paraguay and the Argentine Republic, at the northern extremity of the Gran Chaco, that the explorer with his party had been massacred by the Tobas Indians. He was accompanied by M. Billet, astronomer, a member of the Society, M. Ringel, painter, and another Frenchman, and was about to explore the Pilcomayo, an affluent of the Paraguay. Dr. Hamy, Director of the Ethnographical Museum, stated that at the Ministry for Foreign Affairs, as well as at that of Public Instruction, which had entrusted Dr. Crevaux with his scientific mission, no official information had been received on the subject, and that this silence afforded some grounds for hope. Two Rio Janeiro papers of the 23rd May (the *Gaceta* and *Noticias*) were the first to publish the news in South America, and on their authority the director of a paper devoted to South American interests, and which appears at Paris under the title of *Le Brésil*, communicated the intelligence to the Paris press. Dr. Hamy traced the traveller's route along the Rio Salado to Salta, where he had discovered very important Indian ruins—which formed the subject of his last letter to M. M. Zeballos, President of the Argentine Geographical Institute—to Tarija, and lastly to Tupiza, near which town he had lost his life, with all his companions.—The Ministry of War forwarded the map of routes in Tunis, on the scale of 1 : 400,000, which had been prepared by the geographical service of the Army, under the direction of Colonel Perrier, of the Institute.—A map of the Algerian railways prepared by the Ministry of Public Works has also recently been presented to the Society by that department.—The Governor of Cochin China forwarded maps on the scale of 1 : 100,000 of several arrondissements of the colony (Gocong, Baria, and Bienhoa), prepared by the Topographical Service of Cochin China.—The Geographical Institute of Madrid forwarded the parts of the topographical map of Spain on the scale of 1 : 50,000.—A letter was read from the French Consul at Zanzibar, dated May 4th, announcing the arrival some days previously of M. Cambier, of the International African Association, in company with a Belgian engineer officer who, after having formed a caravan of 200 Zanzibar men, had left on that day (May 4th), for the Upper Congo by way of the Cape. Baron F. von Richthofen informed the Society that he had forwarded a copy of the second volume of his work on China, embodying the results of his journey in the north of the empire, and especially devoted to geology. The topographical and geological maps belonging to this volume will be published with volume iv. which will treat solely of paleontology.—M. Rogozinski, an officer in the Russian Navy, announced his approaching departure on his expedition to the Cameroons district in West Africa.—M. Richard Cortambert gave the Society some particulars respecting an excursion of some importance which has just been made on the Congo by M. Louis Petit, a French naturalist at Landana, at the mouth of the Congo. He had ascended the river as far as Vivi, and contemplated shortly undertaking a journey of exploration among the mountains of the interior.—M. Dutreuil de Rhins communicated a note from the Abbé Desgodins on the Himalayan railway from Calcutta to Darjiling, from which it appears that the enterprise has been so successful that the company has undertaken two new lines. The information furnished by the Abbé Desgodins will be published

in the *Compte Rendu des Séances*.—M. Georges Revoil, the traveller in Somâli-land, offered to the Society the first part of the narrative of his journey, the second part of which will be published shortly; and the Chairman complimented him on the promptitude with which he had finished his work.—M. Brau de St. Pol-Lias presented his work on the river Pluss, in the interior of the Malay Peninsula, which appeared in the *Nouvelle Revue*.—The General Secretary, M. Maunoir, called attention to a collection of articles, including metal utensils, arms, &c., brought home by M. Domergue from the Gaboon, and which were exhibited in the hall.—Colonel Veniukof communicated a note, based on information derived from Russia, on the probability of an early opening of the ports of Korea. The Americans, who had already procured the opening of the Japanese ports, were on the point of doing the same with those of Korea; five ships of war, armed with 40 cannon, and manned by 3400 men, being at Kobe ready to start for Fusan. The king and his prime minister are, it seems, favourably disposed towards the project for the introduction of strangers, and the United States hoped to make an advantageous treaty of peace and commerce.—The meeting concluded with a communication from Dr. Bayol on his journey from Medina to Timbo, in which he described the Futa Jallon highlands, and spoke of the treaty which he had obtained for France. This paper will be published in the quarterly *Bulletin*.

——— Special Meeting, June 23rd: M. FERDINAND DE LESSEPS in the Chair.—This meeting was convened for the purpose of receiving M. Savorgnan de Brazza on his return from his second expedition to the Ogowé and Congo, and hearing from him an account of his achievements. It took place in the large amphitheatre of the Sorbonne, which was filled with a vast crowd on the occasion. M. de Brazza commenced his address by recapitulating the circumstances of his first expedition in 1875-78, when, accompanied by MM. Ballay and Marche, he reached the upper waters of the Ogowé river, and then alone pushed eastwards and northwards, discovering two new streams, the Alima and the Licona, which proved to be tributaries of the Congo. He explained to the meeting the importance of this discovery, these two rivers giving access from the French Possessions on the Gaboon to the navigable part of the Congo, above the long series of rapids and cataracts which render it impracticable from its mouth to that point; and the land journey from the Ogowé valley to the Alima being relatively easy. As a result of this discovery, he was commissioned by the French Committee of the African Association and by the Government to undertake a second expedition, in order to trace the Alima to the Congo, and to establish civilising stations, one on the Ogowé and one on the Congo, and to cultivate the friendship of the native tribes. The Chambers voted a grant towards the expenses, and he left France for Africa on the 27th of December, 1879. M. Ballay remained behind to complete the preparations for the exploration, and it was arranged that he should rejoin M. de Brazza, with a steamer in sections required for the navigation of the Upper Ogowé and Alima. He found some of his old attendants at the Gaboon, and organised his party for the interior without difficulty. Two Europeans joined the party, one M. Noguez, who died afterwards of fever, and M. Michaud, who was now by his side at the meeting. He ascended the Ogowé, and negotiated with the tribes on its banks for the abandonment of their exclusive pretensions; succeeding in this and in organising a regular service of transport on the river confided to the Aduma and Okanda tribes, the best canoe-men of the Ogowé basin. He fixed on a point at the confluence of the Passa with the Ogowé for the establishment of his first station, this point affording facilities for regular communication with the Atlantic, and being also within convenient distance of the Alima and the Congo. A village and plantations near Nghimi were purchased for this object from a neighbouring tribe, and the first station

of the African Association, since named Franceville, was there founded in June 1880. In the middle of the same month he sent down to the coast, under the direction of M. Michaud, 770 men in 44 canoes to meet M. Ballay, judging he must have arrived by that time with the steamer; and leaving M. Noguez in command at Franceville, he started alone with a small party of natives for the Congo. He expected to meet with obstacles to his progress on the part of the Apfuru tribe, who had barred the way to him down the Alima on his first expedition, but he relied on his growing reputation for friendliness throughout the region for softening their hostility. Two or three days' journey from Franceville the nature of the country changes. To the clayey soil of the Ogowé basin and its richly-wooded and moist valleys succeeds a sandy, arid, and hilly country, with here and there, in the neighbourhood of a village, a group of palm-trees. This is the aspect of the country which forms the watershed between the Ogowé and the tributaries of the Upper Congo; and it is a singular fact that these narrow sandy tracts of country along the watershed are everywhere inhabited by one and the same tribe, the Bateké, reputed, probably erroneously, to be cannibals. When he had passed the Leketé, a southern branch of the Alima, his route lay across the plateau of the Achicuya, an elevated district lying about 2600 feet above the sea-level, and separated from another similar plateau (the Aboma) by the river Mpama. The chief of the Achicuya received M. de Brazza in a friendly manner, and a similar reception awaited him on reaching the Aboma tribe. These latter are a fine race of people, handsomer and braver than any he had yet met with. It was here that M. de Brazza first received definite information regarding the Congo and the powerful chief Makoko, whose sovereignty the Aboma acknowledge. Leaving their district, the party next travelled along the Lefini river (the Lawson of Mr. Stanley). He had just finished constructing a raft for the navigation of the stream, when a messenger from King Makoko arrived with offers of friendship. This much facilitated his further proceedings. He descended the Lefini with the envoy as far as Ngampo, leaving there the raft and journeying by land for two days across an uninhabited table-land. His march over the sun-scorched plateau was most wearisome, and he was beginning to find fault with his guide, when, at 11 o'clock at night, after a forced march, he came in sight of the Congo. It appeared like an immense sheet of water, the silvery sheen of which contrasted with the sombre hue of the lofty mountains around. Towards the north-east the water-line extended to the horizon, and the river swept in a noiseless, slow current past the foot of the hills beneath him. His first object on reaching the banks of the great river was to establish peaceful relations with the Apfuru and other tribes of the Ubanji nation. The principal of these were the Alhialumo ("sailors of the Congo"), who are born, live, and die, with their families, on board of the fine canoes in which they carry on a trade in ivory and other goods between the Upper Alima and Stanley Pool: with these he had first to deal. He addressed himself to Ngampey, their chief, who seemed inclined to be friendly. "Choose," M. de Brazza said, "between the cartridge and the flag I send you: one will be the sign of a war without mercy; the other, the symbol of a peace as profitable to you as to us." Here his faithful interpreter and counsellor, Ossia, a Bateké, proved of great use to him, as everywhere throughout the expedition. For the present, however, he left the tribes on this side to calm themselves, and went on to king Makoko. M. de Brazza here remarked that Stanley Pool, some distance below the point where he now found himself, proved afterwards to be 93 miles nearer the Atlantic coast than it had been placed on Stanley's map. He said that his rights of priority and those of the French nation were clearly established over the region between the Ogowé, the Equator, and the Congo; he next wished to extend them over the left bank of the Congo, as far as the confluence of the river Djué, to the

south of Stanley Pool. In this part of the country the plateaux were more fertile and better cultivated than in the interior, and the population was denser and equally pacific. The Mussulman element being unknown in the region, European civilisation need not expect to encounter that hostility, hatred, and fanaticism which oblige the French, for instance, not to advance except with armed force from the Senegal to the Niger; there is nothing to be feared there except the natural opposition of the natives to whatever is new. His first audience with Makoko was on the usual scale of negro magnificence. After the opening ceremonies Makoko spoke in this wise: "Makoko is glad to receive the son of the great white chief of the west, whose acts are those of a wise man. He receives him therefore, and he wishes that when he leaves his territory he may say to those who sent him that Makoko well knows how to receive white men who come to him not as warriors but as men of peace." He remained with the chief twenty-five days, and in his provinces for a longer period, and could not have been better treated. In the end a treaty was concluded, by which the king placed his states under the protection of France, and ceded a tract of country to be selected by M. de Brazza on the shores of the Congo. The treaty was ratified on a day appointed in the presence of all the neighbouring chiefs, vassals of Makoko. On the treaty being signed the grand fetish-master put a little earth in a box and presented it to M. de Brazza, saying, "Take this earth and carry it to the great chief of the whites; it will remind him that we belong to him." De Brazza, on his part, planted the French flag before Makoko's house and said, "This is the symbol of friendship and protection which I will leave with you. Wherever waves this emblem of peace, there is France, and she will cause to be respected the rights of all those whom it covers." Soon afterwards M. de Brazza had to leave Makoko to attend an assembly of Ubanji chiefs at Nganchuno on the Congo. This proved an imposing affair, the chiefs coming to the meeting from all parts in large canoes, and much opposition was shown to the conclusion of a treaty, the chiefs expressing their mistrust, on account of a previous white traveller having shot some member of the tribe, and disappeared down river too swiftly to be followed. However, after a second grand meeting and debate a treaty of peace was arranged, and war was interred. This latter ceremony consisted in each chief and each man of De Brazza's party burying some implement of war in a hole over which a quickly-growing tree was afterwards planted. French colours were then distributed among the chiefs, and the treaty definitely agreed to. The expedition then departed to found the second French station, the site fixed for which was at Ntamo on the left bank of Stanley Pool, five days' journey in canoe downward from the place of assembly of the Ubanji chiefs. M. de Brazza pointed out that Ntamo by its position is the key to the Congo interior. At this place he stayed eighteen days and was well entertained by the natives. He told the assembled chiefs of the district that he had taken possession of the tract of country lying between the river Djué and Impila on the left bank of the Congo. The act of taking possession was drawn up and signed conformably to the orders of Makoko, and the villages thereupon hoisted the French flag. This was on the 1st October, 1880; the settlement has been named Brazzaville. Leaving a Senegal sergeant and three men in charge of the station, M. de Brazza now proceeded to explore a new route down the banks of the Congo to the sea. This was by the valley of the N'Duo, which empties itself into the Niari and leads from Ntamo to the Atlantic coast in a nearly due westerly direction. He thought this would be the easiest and nearest route to the coast, but it was so entirely unknown that the name under which the Niari discharged itself into the ocean had yet to be ascertained. However, the route proved so hazardous that he was compelled to abandon the attempt for the present, and continued his journey down the Congo, on his way meeting with Mr. Stanley, who gave him a cordial reception. From the mouth of

the Congo he sailed to the Gaboon, arriving at Libreville on the 15th of December, 1880. Here a cruel disappointment awaited him. Neither Dr. Ballay with the steamer nor the personnel for the permanent establishment of the stations had arrived. It seemed as though he had been forgotten and abandoned by his friends in France. It was with painful feelings that he found himself so ill-supported, and obliged, instead of returning to Europe to rest after his fatigues, having performed himself all he had undertaken to do, to hasten again into the interior in order to carry reinforcements to the men left in charge of the two stations he had founded, distant the one 500 and the other 800 miles in the interior. He started accordingly with a party, strengthened by the addition of two French sailors, Guiral and Amiel, and a number of native carpenters, gardeners, &c. In ascending for the third time the Ogowé, his canoe was upset at the Boié falls, and he suffered much from dysentery brought on by having to work long in the water to save his baggage. Arriving at Franceville in February 1881, he found there about 100 natives satisfactorily established and engaged in various industries. The gardens had been well cared for, and the settlement was self-supporting. It was necessary to prepare here the means for the transport of the steamer when it should arrive; 75 miles of portage intervening between the station and the confluence of the Obia and the Lekiba with the Alima, the point chosen for the commencement of the navigation of the last-mentioned river. The clearing of a path for the transport of the sections of the steamer was accomplished by the aid of 400 labourers, superintended by Michaud, Guiral, and Amiel; the organisation of a service of transport was then proceeded with, a business of some difficulty owing to the jealousies of the tribes with regard to the profits of conveyance over different sections of the route. M. de Brazza aimed at the establishment of a single body of carriers, but obstacles of various kinds intervened, and he had meantime to send supplies to Brazzaville on Stanley Pool. Meantime, on the 27th September, 1881, M. Mizon, of the French Navy, sent from France in company of Dr. Ballay, arrived at Franceville, with news that Dr. Ballay was detained at the Gaboon, and that defects of construction which had been discovered would prevent for some time the arrival of the expected means for the exploration of the Alima. M. de Brazza then resolved to leave M. Mizon in sole charge at Franceville, and to set out on an entirely new exploration of his own, which was to survey the new and more practicable route which he supposed to exist, and which he had attempted to follow on his first journey, from Stanley Pool to the Atlantic via the Niari valley. He first travelled to Nhango on the route between the Ogowé and the Congo, near the Mpama tributary of the latter river. There he learnt that Stanley had been endeavouring to win over to his service Malamine, the chief of the French station at Ntamo, and to persuade the chiefs of the Bateké to withdraw from their engagements with the French; but M. de Brazza believed that there was no prospect of his succeeding in this, and he therefore continued his plans for journeying by the new route he had planned to the Atlantic. He started at the end of January 1882, passing over mountains by the sources of the Leketi and the M'paka, and on the 8th February discovered the source of the Ogowé at a point where it formed a mere runlet of water. A month later he arrived on the banks of the Niari, which proved to be a beautiful river 270 feet broad, and to enter the Atlantic under the name of Quilliou. Not far from its left bank are found mines of copper and lead. Along this bank he continued his march, finding to his great satisfaction that the river as far as its confluence with the Lalli flowed, without rapids or falls, along a broad, fertile, and densely-peopled valley lying athwart the great parallel terraces over which, ladder-like, the neighbouring Congo has cut its bed on its way to the ocean. About 60 miles further west the Niari trends a little towards the north, and he quitted its banks after having crossed its little

affluent the Nkengé. From there he began the ascent of a plateau where the villagers no longer received him and his party with the friendliness he had encountered along the valley of the Niari. The mistrust with which they had to contend led at last to a hostile encounter at the village of Kimbendge, in which six of his men were wounded, and they were obliged to beat a retreat. They marched, without taking food and amid a pouring rain, all night long in a southerly direction, finding themselves in the morning at the summit of a mountain range, at the foot of which extended the verdant plain through which flowed the Lundima or Loema. In the plain they passed a group of villages named Mboko, where copper ore is found on the surface, and, continuing their route westward, arrived at Kimbunda, a Basundi village situated between the Lundima and the Loango. This place is within five or six days' march of Emboma on the Congo on one side, and Landana, a seaport on the Atlantic, on the other. The party arrived, exhausted with the fatigues and dangers of their long march, at Landana on the 17th of April last. In concluding, M. de Brazza claimed to have added during his recent expedition a tract of country about one-third the area of France to his previous discoveries; and he insisted upon the importance of the position of Ntamo, which he said was the key to the whole western interior of Equatorial Africa; it was in the hands of France, and the route *viâ* the Niari was the best road to it,—the best line for a railway, which ought to be undertaken by the French as the most effectual means of opening up the country.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Coles, John.—*Summer Travelling in Iceland*; being the narrative of two journeys across the island by unfrequented routes. With an historical Introduction, and some hints as to the expenses and necessary preparations for a tour in Iceland. With a chapter on Askja, by E. Delmar Morgan, F.R.G.S. Containing also a literal translation of Three Sagas. London (John Murray): 1882, large 8vo., pp. x. and 269, map, plans, and plates. Price 18s.

The journeys which were the primary cause of this useful volume have already been practically described by Mr. Cuthbert E. Peek (who accompanied its author and Mr. Morgan) in the March number of our 'Proceedings' for the present year. Mr. Coles, whose capabilities both as a scientific observer and traveller are familiar not only to the Fellows of this Society who consult our collection of maps of which he is Curator, but to the numerous pupils who have benefited by his instructions in practical astronomy, found so much of interest and novelty during the expedition, that he has amplified its incidents and results by the addition of the other matter referred to in the title, for the advantage of after-comers. He refers to C. G. Warnford Lock's 'Home of the Eddas' (now out of print), as the only recent book of real service to travellers in Iceland,—the Guide-book by W. G. Lock, noticed in our June number, not having been published when the present volume was in the printer's hands. The instructions on outfit and expenses at the end of the book will be found amply sufficient on all points for intending visitors; and the three lengthy Sagas also given in the Appendix, which date from the beginning of the eleventh century and have never before been given in this complete condition in English, add a special value to the work.

Beyond the topographical interest of the scenes described, and the excellence of the illustrations, which are mostly from sketches by the author, this book will recommend itself by its map, which (on the scale of 15 English miles to the inch) is the most accurate and complete at present existing, being founded on

Gunnlaugsson's, with corrections and additions by Mr. Coles. Many heights have been recalculated and are given in English feet, others are added from aneroid observations during the journey; and those of the lower stations have been supplied by the Danish meteorological office, through Admiral Irminger. An inset (scale 1:200,000) shows the Askja lava field, from Lieut. Caroc's survey; and the plan of the Great Geysir is reproduced by permission from the March number of our 'Proceedings.'

ASIA.

Stanford's Compendium of Geography and Travel.—Based on Hellwald's 'Die Erde und ihre Völker.' ASIA, with Ethnological Appendix by Augustus H. Keane, M.A.L. Edited by Sir Richard Temple, Bart., G.C.S.I., D.C.L. London (Stanford): 1882, large post 8vo., pp. xxxii. and 723, maps and illustrations. Price 21s.

The volumes describing Africa, Central and South America, and Australasia, having already been published, there now remain Europe and North America to complete the series; the former of these is to be edited and extended by Sir A. C. Ramsay, and the latter by Professor F. V. Hayden for the United States, and Professor A. R. C. Selwyn for British America, Mr. Keane in each case supplying (as before) an ethnological appendix. As in its predecessors, the German basis of this volume is recast and much enlarged; and as the editor refers to a careful revision of the whole work (except the appendix), its merits may practically be considered as but very slightly depending on Hellwald's original. The editor emphasises the divisional arrangement by which political and natural sections are simultaneously retained, and also the scheme of minor headings for facilitating reference; he also refers to the incorporation of various specified novel features, mostly of a geographical nature.

The maps represent Asia both physically and politically, with nine separate subdivisions, of which that representing the Russo-Chinese frontier and Kulja district may be specially referred to as new.

AFRICA.

Hesse-Wartegg, Ernst von.—Tunis: The Land and the People. London (Chatto and Windus): 1882, 8vo., pp. 292, illustrations. Price 2s.

This account, translated from the German of the same author, is partly from his personal experiences during a recent stay in the Regency and partly from consular Reports and other official sources. It includes some provincial details, a chapter on Kirwan, and a discussion of Captain Roudaire's proposed inland sea, in which it is argued that the large area of water to be created by letting the Mediterranean into the Sebchas or Shotts would not have the effect of creating a new vegetation in the now arid steppes. Not a tree is to be seen for hundreds of miles in Tripoli and other North African districts as far as Egypt lying by the Mediterranean; the Red Sea, which the projected one would resemble, is surrounded by desert land; and even those parts of Tunis in the Shott region bordering on the sea from Sfax to Gabes and Sarsis, are only desert. The palms in the only oases found in this desolate littoral afford an uncatchable produce, on account of the excess of humidity forcing a premature fruiting; and the author assumes on these grounds that the creation of an artificial inland sea would result in the destruction of the date-harvest throughout the now productive oases of the Jerid.

Révoil, Georges.—La Vallée du Darror. Voyage aux pays Çomalis (Afrique Orientale). Paris (Challamel Aîné): 1882, large 8vo., pp. xiii. and 388, map, plates, tables. [No Index.]

The author here gives a detailed and well-illustrated account of his third journey into the country of the Mijjertain Somali west and south of Cape Guardafui, undertaken as a scientific mission in 1880 under the auspices of the French Minister of Public Instruction. His two former visits (for purely commercial purposes) in 1877 and 1878 were described in the little work 'Voyage

au Capdes Aromates,' noticed in our 'Proceedings' for 1880, p. 393, and referred to (with the few other works or papers on this region) in the preface to the present volume. His preliminary work enabled him to obtain an accurate knowledge of the land and of its people, with their habits and customs; he also made collections sufficient for a general idea of the fauna and flora of this arid and desolate region—a vast necropolis (as he writes), in the burial places of which are hidden ethnographical treasures and an entire page of the history of days gone by.

From Aden (of which a lively description is given), M. Révoil reached Bender Meraya (or Muriyeh), where he had an interview with Osman Mahmoud, the Sultan: thence he skirted the north-east coast past Guardafui to Toben and Bergnel, striking back again by land across the base of the Cape to Bender Khor, and returning to Meraya, from which point he went inland to Aren. His next journey was westward along the northern coast to Bender Gâzem (Bossossa); whence he endeavoured to reach the mountain range of Karkar which forms the southern wall of the Darror valley and reaches the eastern coast at the curious peninsula of Haffun; but, soon after reaching Gûrgui Nûr on the northern side of the valley, at the head-waters of the streams formed by the drainage of the western versant of the Almascate mountains, he had to retrace his steps to the coast, and returned to Aden. Starting again from that port, he landed at Las Goré, and once more endeavoured to penetrate to the interior, striking south-east across the Almedo coast range through the Warsingali country to Gob-Déro on the upper waters of the Darror, where he was forcibly stopped. Abandoned by his escort, he succeeded in crossing various parallel ridges and valleys supplying the southern affluents of the upper Darror until he reached Fararalé, and finally arrived at the northern slopes of the Karkar range, to the west of the point aimed at on his former attempt. Troubles with native marauders and wars followed his return by a more eastern but nearly parallel route, via Rhat and Mana to Las Goré, from which point he again essayed to reach the Mijjertain country by the coast hills, only to find the road barred by new hostilities which compelled him to turn once more to Las Goré by the coast from Durduri. After another short coast journey to the west as far as Korderia, he finally returned to Aden.

The first eleven chapters of his book are devoted to the account of these explorations, with incidental descriptions of the country and people. The archaeological and ethnographical aspects are discussed in the twelfth chapter, and the thirteenth is devoted to a generalisation of the whole region traversed, in which the chief features of the physical geography, water system, climate, fauna, flora, and native tribes are described (as to the people, with considerable detail on religious, legal, economic, and industrial points); in chapter 14 a scientific sketch of the fauna and flora is given, with native names, &c.; and another chapter on commercial statistics concludes the text, with a table of native weights, &c.

The tables represent barometric and thermometric observations from October 1880 to May 1881; and a list of seventeen geographical positions determined by the aid of sextant and artificial horizon is added.

The map (scale 1:1,500,000) is a great improvement on that given in the former work, and shows in pedigree form the family origin of the Guardafui Somali. Many of the plates and smaller illustrations are evidently from photographs, and the somewhat peculiar style of engraving is in most instances specially adapted for rendering the arid and desolate scenes depicted. Various drawings of ethnographical and anthropological interest are given.

AMERICA.

[Selwyn, Alfred R. C.]—Geological and Natural History Survey of Canada. Alfred R. C. Selwyn, LL.D., F.R.S., Director. Report of Progress for 1879-80. Montreal (Dawson Bros.): 1881, 8vo., map, plates, and sections. Maps separate. (Sampson Low & Co.)

This voluminous report, not long received in England, contains as usual a mass of observations bearing on the physical geography of British North

America, with many details of actual travel and exploration. It consists of the following parts:—

Introductory Report by Dr. Selwyn, pp. 1-9.

A. Report on boring operations in the Souris River Valley, also by Dr. Selwyn, pp. 1-11, with two Appendices, pp. 12-55, on the lignite tertiary formation, from the Souris river to the 108th meridian, by G. M. Dawson, and on the fossil plants collected in the lignite tertiary of Roche Percée, by Principal Dawson.

B. Report of an exploration from Fort Simpson on the Pacific coast to Edmonton on the Saskatchewan, embracing a portion of the northern part of British Columbia and the Peace river country, by G. M. Dawson, with Appendices, containing a list of the plants collected, meteorological observations in the region indicated and also between Edmonton and Manitoba, a note on latitudes and longitudes, and a paper on the distribution of some of the more important trees of British Columbia, pp. 1-177, with a map illustrating the last subject.

C. Report on Hudson's Bay and some of the lakes and rivers lying to the west of it, by Robert Bell, with various appendices; on fossils collected in Manitoba (J. F. Whiteaves); plants collected, with notes (Prof. Macoun); *Coleoptera* collected in Manitoba and between Lake Winnipeg and Hudson's Bay (J. L. Leconte); list of land, fresh-water and marine *Mollusca*; analysis of the waters of Hayes and Nelson rivers (Prof. Dittmar); seasonal or periodic events at York factory; table showing dates of opening and closing of Hayes' river at York factory (W. Wood); dates of arrivals of the Hudson's Bay Company's vessels at York factory and their sailings, for 93 years, from 1789 to 1880; seasonal or periodic events at Moose factory; dates of arrivals, &c., at Moose factory for 147 years, from 1735 to 1880; and various meteorological observations taken at both factories, pp. 1-113.

D. Report on Northern New Brunswick, by R. W. Ells, pp. 1-47.

F. Report of Surveys in Richmond, Inverness, Guysborough and Antigonish, Nova Scotia, by Hugh Fletcher, pp. 1-125.

G. Report of a geological exploration of the Magdalen Islands, by James Richardson, pp. 1-15.

H. Various contributions of a chemical nature, on minerals &c., by G. C. Hoffmann, pp. 1-21.

The plates (from photographs, roughly engraved, but with a tone of fidelity) represent various topographical features not before figured. The separate maps show: (1) part of British Columbia and the North-West Territory, from the Pacific Ocean to Fort Edmonton, in three sheets (Scale 1 : 506,880, or 8 statute miles to the inch), compiled from various acknowledged sources, with heights and much interpolated information in type of two colours, respectively describing the general geographical and the geological features of the districts mapped, with coloured geological sections. This is to accompany Dr. Dawson's Report on the Peace river explorations, and embraces all the available information regarding a region about 130,000 square miles in extent, from the Pacific Ocean to the 112th meridian, and from the 54th to the 57th degree of north latitude. (2) The general northern limits of the principal forest trees of the dominion of Canada (scale 80 miles to the inch), by Robert Bell.

As a result of the explorations recorded in section A of this Report, it may be noted that from the Souris river region to a point near the 108th meridian, the lignite tertiary beds exist, generally nearly horizontal, overlying the cretaceous. The coaly material in them is composed of flattened and carbonised tree trunks, and though inferior in combustion to that obtained from the Rocky Mountains, has the advantage of being more easily workable from the outcrops avoiding vertical sinking.

Dr. Dawson's Report (B) has enabled large additions to be made to our knowledge of the physical and climatic features of the vast region covered by it: it is in fact the result of an exploration of which the object was to obtain all possible information on the physical features and economic importance of the country, for the purpose of determining to what extent it offered advantages for the passage of the Canadian Pacific Railroad. A preliminary notice was published by Mr. S. Fleming in his Railway Report for 1880; but the present

paper contains more elaboration and extension of the subject, pp. 2-99 being essentially geographical, including descriptions of the ranges, prairies, lakes, rivers, and their drainage area, climate, animal and vegetable products, natives &c., independently of the purely geological aspects, which are separately discussed.

Dr. Bell's Report (C) on Hudson's Bay is an account of the continuation in 1880 of his western explorations during the two previous years, the general deductions from which, as given at pp. 27-38, have already been published by the author in our 'Proceedings' for 1881, pp. 577-586.

In Mr. Ellis's part (D), which embraces portions of the counties of Restigouche, Gloucester, and Northumberland, in Northern New Brunswick, the results are given of work during 1879 in the exploration of the rivers Nipisquit, Upsalquitch, Restigouche, Tobique and its right-hand branch, and the Tête-à-gauche, embracing a canoe journey of some 650 miles, also surveys of the coast from Bathurst north to Campbellton; also of operations in 1880 (mostly by canoe) on the Jacquet river and the Quebec shore from the Metapedia to the mouth of the Neuvele opposite Dalhousie, the North-west Miramichi and its branches, the Sevogle and Little South-west Miramichi (including their sources), the main South-west Miramichi, the south branch of the Nipisquit, and the wilderness country lying round the heads of those streams. The entirely unsettled state of the inland part and its dense forest, often forming impenetrable jungle, have hitherto prevented any knowledge of this region being obtained. A map (4 miles to the inch) is now nearly ready for publication.

Mr. Fletcher's Report (F) is almost wholly geological: it contains, however, a brief sketch of the general physical characteristics of the Richmond, Inverness, Guysborough, and Antigonish sections of Nova Scotia, and some useful observations on the distribution of economic mineral substances.

Finally, in Mr. Richardson's account (G) of his work in the Magdalen Islands, Gulf of St. Lawrence, a description is given of this little-known group, of the 13 islets composing which Amherst is the chief. A list of 79 plants collected on them is given by Prof. Macoun, from which it is apparently to be inferred that the climate is humid and cool, and scarcely warm enough to ripen wheat.

ARCTIC.

[**The Dutch Expedition of 1881.**—Verslagen omtrent den vierden Tocht van de Willem Barents naar de Ijszee in den Zomer van 1881, uitgebracht aan het Comité van Uitvoering. Haarlem (H. D. Tjeenk Willink): 1882, 8vo., pp. 146, maps and plates.

This report of the fourth journey of the *Willem Barents*, published on account of the Dutch Committee for Arctic Sea navigation, is not on sale. It is prefaced by the official articles of association of a society founded under the name of that old Dutch traveller for the purposes of scientific exploration in the Polar Sea, and of promoting trade between the Netherlands and Siberia; and after setting out the instructions and resolutions of the committee, with the equipment of the vessel, gives a detailed account of her work in the Spitzbergen and Barents seas, from the start on May 7th to the return on October 26th, 1881. To this are added two Appendices by Dr. Max Weber, the first being a report on the zoological results of the voyage (including a list of dredging stations, with depths and results, &c.), and the second on the hygienic conditions; and also a third report by L. A. H. Lamie and C. F. G. de Booi on the magnetic observations, with tables of results of intensity obtained in the summers of 1879, 1880, and 1881, as well as of declination and inclination in the latter year.

The map shows the ship's track, and also that of the *Louise* and *Dahlman* through the Kara Sea to the mouth of the Yenisei and along the ice pack east of Novaya Zemlya; it represents also the condition of the ice at different periods of the year 1881. The plates, from photographs by Mr. W. J. A. Grant, who accompanied the expedition, represent a cairn on the Orange Islands, Rosmylow's hut, and Belusha Bay. Profiles are also given of the north coast of Novaya Zemlya near Cape Mauritius, with a sketch map showing the position of the Orange Islands.

GENERAL.

[**De Castro.**].—Roteiro de Lisboa a Goa, por D. João de Castro. Annotado por João de Andrade Corvo. Lisboa (Academia Real das Sciencias): 1882, 8vo., pp. xv. and 428, maps, plates.

After the publication in 1833 by Nunes de Carvalho of De Castro's "Roteiro do Mar Roxo," the great Portuguese traveller's "Roteiro da Costa da India de Goa a Dio" was edited by Diogo Köpke, who in his preface referred to two copies (one as he says incomplete, and both of small authority) of the "Roteiro de Lisboa a Goa" in the Public Library at Evora in Portugal. Señor de Andrade Corvo has now made a minute examination of these copies, one of which he thinks to be evidently modern, though the other is complete, evidently much older, and worthy of confidence. Señor Basto, the authority on whom he relies, is of opinion that this latter copy is anterior to 1578, and that it was given to the Evora Jesuits by Dom Henrique himself. This log-book is the first written by De Castro, that referring to the Red Sea being the last of the three. It commences with his start from Belem in April, and ends with his arrival at Goa in the middle of September, 1538. The plates give reproductions of the old coast-lines, plans, maps, &c., and De Castro's journey is shown on a special key map, with dates.

In an appendix, the annotator discusses the curves of equal variation of the sixteenth century, giving the latitudes and longitudes of De Castro and other navigators with magnetic declination, and maps showing the variation in the sixteenth century (as regards the travellers named) and in 1878, also a representation of the declination as regards Lisbon, Paris, and London, since the sixteenth century.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

EUROPE.

Austrian Government.—Specialkarte der Oesterreichsch-Ungarischen Monarchie. Scale 1 : 75,000 or 1 geographical mile to an inch. K.-k. militär-geografisches Institut, Wien, 1882. Price of sheet 1s. 4d. (*Dulau.*)

The following sheets are just published: Zone 3, Col. X. Aussig und Leitmeritz. Zone 4, Col. VI. Rossbach in Böhmen und Oelsnitz in Sachsen. Col. XI. Saaz und Komotau. Col. XI. Melnik. Zone 5, Col. VI. Asch. Col. VII. Eger und Falkenau. Zone 7, Col. VIII. Bischofsteinitz und Nürschau. Zone 8, Col. VIII. Taus und Klattau. Zone 16, Col. XIII. Birkfeld. Zone 19, Col. XIII. Marburg. Zone 20, Col. XIV. Pettau und Vinica. Zone 22, Col. XIV. Agram. Col. XV. Dubrava und Gradec. Zone 23, Col. X. Sessana und St. Peter.

Haardt, Vinzenz von.—Wandkarte der Alpen nach dem Entwurfe und unter der Leitung des Vinzenz von Haardt ausgeführt in Eduard Hölzel's geographischem Institut in Wien. Scale 1 : 600,000 or 8.1 geographical miles to an inch. Verlag von Eduard Hölzel in Wien, 1882. Price 2l. (*Dulau.*)

This is an orographical map showing distinctly the whole system of the Alps; it has also all the roads, railways, and other means of communication laid down, and is accompanied by a pamphlet containing a large amount of statistical information and an index map on which are laid down, and distinguished by different colours, the boundaries of the Western, Central, and Eastern Alps, as well as the limits of the different ranges of which they are composed.

Maschek, R., sen.—Karte von Mittel- und West-Kärnten und dem nördl. Krain &c. 2 Bl. Scale 1 : 150,000 or 2 geographical miles to an inch. Oestl. Bl. II.

Mittel-Kärnten und das nördl. Krain.—Umgebung von Klagenfurt, Villach und Veldes.—Die Villacher Alpe, der Terglou und die westl. Karawanken. Verlag und Eigenthum von Artaria & Co. Wien, 1882. Price 3s. (*Dulau.*)

Prussian Government.—Karte des Deutschen Reiches. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme, 1881-2. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—82, Neumünster. 110, Cuxhaven. 178, Harburg. 181, Ludwigslust. 212, Lenzen. Price 1s. 6d. each. (*Dulau.*)

Stanford, E.—Library Map of England and Wales, constructed on the basis of the Ordnance Survey, and the Census, and adapted to the various branches of civil or religious administration. With Railways and Stations, Roads, Canals, Principal Parks, Antiquities, and other Features of Interest. Scale 1:381,000 or 5·2 geographical miles to an inch. Edward Stanford, London, 1882. Price in sheets, coloured, unmounted, 2*l.* 5s. Mounted, in 4 sections, to fold in morocco tuck case, 3*l.* 13s. 6d. Mounted on rollers and varnished, for the wall, 3*l.* Mounted on spring roller 6*l.*

The size of this map is 66 inches by 80 inches, and its scale, 6 statute miles to the inch, is sufficiently large to make it most useful for reference on any of the subjects of information which it contains; for instance, the importance of any city, town, or village, as regards the number of its population, can be seen at a glance by the character in which its name is engraved, and this system at once illustrates the great difference in this respect between the Manufacturing, Mining, and Agricultural Districts. Coastguard Stations, Lifeboat Stations, Lighthouses and Lightships, are all laid down, and the Rivers, with all their tributaries, are so plainly delineated that a good notion of the Orography and Geology may be gathered without any special colouring. All means of communication, either in existence or under construction, appear to be carefully laid down.

Steinhauser, A.—Orts- und Strassenkarte des Königreiches Ungarn (mit Inbegriff des ehemaligen Siebenbürgen) nebst Kroatien und Slavonien. Scale 1:1,296,000 or 17·7 geographical miles to an inch. Bearbeitet von A. Steinhauser, k. k. Reg.-Rath. Wien, Eigenthum und Verlag von Artaria & Comp. 1882. Price 4s. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st May, 1882.

6-inch—County Maps:—

ENGLAND: Cheshire, Sheets 11, 18, 27, 35, 42, 43, 49, 50, 62 (66 and 68), 2s. 6d. each. Sheet 10, 2s.

SCOTLAND: Island of Islay (Argyllshire), Sheet 196, 2s. 6d. Hebrides, Harris, &c. (Inverness-shire), Sheet 6, 2s. 6d.

25-inch—Parish Maps:—

ENGLAND—**Buckingham**: Castle Thorpe, Area Book 1s.; Great Linford, Area Book 1s.; Hanslope, Area Book 1s.; Haversham, Area Book 1s.; Moulsoe, Area Book 1s.; Willen, Area Book 1s. **Cornwall**: Lanhydrock, Area Book 1s.; Lanivet, sheets XXXIII.—16; 3s. XXXIII.—8, 11, 12; XXXIV.—5, 6, 9, 10, 13, 14; XLII.—1; 3s. 6d. each. XXXIV.—1; 4s. Area Book 2s. **Derby**: Dale Abbey, Area Book 1s.; Horsley, Area Book 1s. 6d.; Morley, Area Book 1s. 6d.; Ockbrook, Area Book 1s.; Stanley, Area Book, 1s.; Willington, Area Book, 1s. **Gloucester**: Filton and D. (Det., Nos. 1 and 2), sheets LXVIII.—13; LXXI.—4; LXXII.—1; 3s. 6d. each. LXVII.—16; 4s. LXXI.—8; 5s. Area Book 1s. **Monmouth**: Dingestow, Area Book 1s.; Llandogo, sheets XV.—9, 13; XXI.—(1 and 2), 5, 9, 13; 3s. 6d. each. Area Book 1s.; Llanellen, sheets XII.—6; 3s. XII.—7, 8, 10, 11, 12, 15; 3s. 6d. Area Book 1s.; Llanwenarth, Area

Book 2s.; Llanfoist, Area Book 1s.; Llantilio Pertholey (Det.), Area Book 1s.; Tintern Parva, Area Book 1s. **Oxford:** Alkerton, sheets V.—2; 3s. V.—1, 6; 3s. 6d. each. V.—5, 10; 4s. each, Area Book 1s.; Bloxham, Area Book 1s.; Charlbury, Area Book 2s.; Great Tew, Area Book 1s. 6d.; Nether Worton, Area Book 1s.; Sandford, Area Book 1s.; Shipton-under-Wychwood, Area Book 1s. 6d.; South Newington, Area Book 1s.; Swalcliffe, sheets IX.—5, 6; 3s. each. V.—6, 9, 13, 14; VIII.—8; IX.—2; 3s. 6d. each. V.—5, 10; IX.—1; 4s. each. Area Book 2s. Swerford, Area Book 1s. **Shropshire:** Longford, Area Book 1s.; Withington, Area Book 1s. **Suffolk:** Eyke, Area Book 1s.; Hasketon, Area Book 1s.; Sutton, Area Book 1s.; Ufford, Area Book 1s.; Warren House, Area Book 1s.

SCOTLAND: **Orkney and Shetland** (Orkney): Deerness, Area Book 1s. 6d. Flotta, Area Book 1s.; Holm, Area Book 1s. 6d.; Hoy and Graemsay, Area Book 1s.; Sandwick, Area Book 2s.; St. Andrew's, Area Book 1s. 6d.; South Ronaldsay, Area Book 3s.; Stromness, Area Book 2s.; Walls, Area Book 1s. 6d.

ASIA.

Kiepert, Dr. H.—Professor C. Haussknecht's Routen im Orient, 1865–1869. Nach dessen Originalskizzen redigirt von H. Kiepert. 4 Blätter: I. II. Nord-Syrien, Mesopotamien und Süd-Armenien. Scale 1:600,000 or 8·1 geographical miles to an inch. III. Kurdistan und Irak. Scale 1:800,000 or 10·9 geographical miles to an inch. IV. Centrales und südliches Persien. Scale 1:800,000 or 10·9 geographical miles to an inch. Berlin, Verlag von Dietrich Reimer, 1882. Price 10s. (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Der Kurs und die Wichtigsten Entdeckungen der "Jeannette-Expedition, 1879–81." Provisorische Orientierungsskizze nach den im New-York-Herald veröffentlichten Karten, Berichten und Ansichten. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 11. With inset maps and views. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Mission Topographique du Haut Sénégal.—Carte des Environs de Medine. Scale 1:50,000 or 1·4 inches to a geographical mile. Paris. Price 2s. (*Dulau.*)

—— Carte des Environs de Kita. Scale 1:50,000 or 1·4 inches to a geographical mile. Paris. Price 2s. (*Dulau.*)

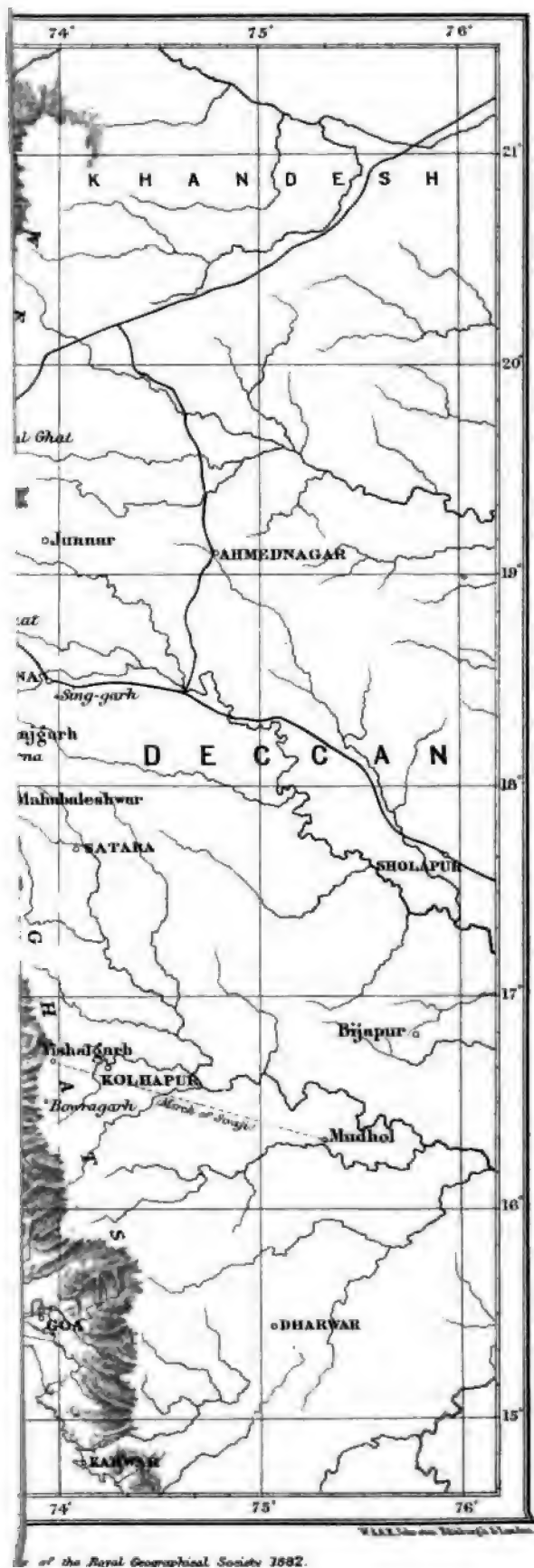
—— Itinéraire de Kita à Mourgoula. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris. Price 2s. (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Originalkarte der neuesten Routen-Aufnahmen von Dr. Emin-Bey u. Mr. F. Lupton im Gebiete der Bari, Lattuka u. Schuli 1880 u. 1881. Entworfen und gezeichnet von Bruno Hassenstein. Scale 1:500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Taf. 12. Justus Perthes, Gotha. (*Dulau.*)

Vallière et Piétri.—Haut Sénégal et Haut Niger. Carte de la Mission Galliéni. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Price 8s. (*Dulau.*)

ATLASES.

Meteorological Council.—Meteorological Charts for the Ocean District adjacent to the Cape of Good Hope. Published under the authority of the Meteorological Council. Official No. 43. Official Copy. London. Printed for Her Majesty's Stationery Office, and sold by J. D. Potter, and Edwd. Stanford, London, 1882. Price 1l. 5s. With one volume of Explanatory Remarks, price 7s.







From Greenwich



PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Geographical Excursions in South Central Madagascar.

By the Rev. WILLIAM DEANS COWAN.

(Read at the Evening Meeting, June 12th, 1882.)

Map, p. 584.

IN 1874, while in connection with the London Missionary Society (a society whose agents have done much to add to our knowledge of Madagascar), we took up our residence at Fianántsóa, the second town in the island, and the capital of the province of Betsiléo.

Of our journey from the coast in the autumn of that year, little requires to be said, as the route and the tribes through which we passed are well known to all who have taken interest in the island. The works of Ellis, Sibree, and Mullens, together with the journal of Lieut. Oliver, give graphic accounts of this part of the country. Like all travellers, we were struck with the charm and beauty of the coast scenery, the solemnity and grandeur of the forests, but disappointed with the barren uplands of Imérina.

We entered Betsiléo shortly after Dr. Mullens had left it, and unfortunately it was not given us to make his acquaintance, or to receive from him any geographical results which had been obtained by his party, so that our work was begun without any aid from previous maps. A most remarkable sketch-map had been published, accompanying a small pamphlet from the pen of one of the missionaries; but it was such as only Mark Twain could have conceived in his happiest moments. Everything was put just where it ought not to have been, and rivers were made to run where no river could run, and where no river ever did run. M. Grandidier had also visited the province before 1874, having journeyed from the east coast at Mananzára; but with the works of this distinguished traveller I am not fully acquainted.

Among those who accompanied Dr. Mullens to Betsiléo was a Mr. Cameron, to whom we are largely, if not entirely, indebted for the excellent maps that we now have of the provinces of Imérina and Betsiléo.

Mr. Cameron no sooner entered Betsiléo than he measured out a base line, between Ikánjasóa and Iháranány, and began a system of triangulation, so that by the close of the year, when we reached Betsiléo, much of the real hard work had been done, though the results had not been made public.

Early in 1875 I began to work over the province, taking Cameron's base line. I traversed it in all directions, until every mountain, hill, valley, river, and stream were familiar to me, so that when Mr. Cameron's compass came into my possession at his death, I was able to go over the province in a satisfactory manner. From Betsiléo, with its many mountain-peaks and characteristic hill-tops, now so well known, I was able to carry on the same system, to the east, south, and west, through the provinces of the Tanála and Bára, the results of which are given in the sketch-maps of these provinces illustrating the present paper.

The province of Betsiléo has been described by Sibree and Mullens in their works, I will therefore content myself with a general notice of it, and that principally to draw attention to the watershed of the district, and to what appears to be a very strict divisional line, separating the island into an eastern and western region, each having its characteristic flora and fauna.

The watershed of Central Madagascar, that is, the provinces of Imérina and Betsiléo, is in close proximity to the western edge of the great forest, marked green on the map, and within a few miles west of the sudden dip which the country takes to the east. In an area of a few miles there are considerable numbers of small spongy valleys, from which the head-waters of the main rivers ooze out, and take their flow to east or west, as the case may be. In Betsiléo these are situated very nearly in $47^{\circ} 30' E$. The important rivers which rise in this watershed are the Mananzára, the Inamórona, the Faráony, and the Matitánana, with many of their tributaries, all of which flow to the east; the Maniá and the Matsiátra or Onymainty, with its many important affluents, such as the Manantánana, the Manambólo, and the Faníndrona, flowing to the west. Within a very few miles, in the neighbourhood of the mountain Irátra, we have the sources of the Matsiátra, Inamórona, Faráony, Matitánana, and the Manantánana, all of which are rivers of importance, and which drain South Central Madagascar.

The Matsiátra is the principal river, and on this account I will endeavour to describe its course.

Oozing out from the small marshes lying at the western base of the great mountain Irátra, it flows directly northward, mostly through a marshy valley, as far as Ambohipó, a few miles east of Fianárantsoa. Here it begins to take a north-westerly course past Ankaramilaza and Ambohimánitra, where it has become a river of some considerable size. Flowing onwards in the valley between Ambohinámboárina and Ifanjakána, it receives from the north the Faníndrona and the Manandriána

rivers, after which it flows westward as far as Imedóngy, where it takes the name of Onymáinty or Black River, and flows away to the south-west, forming the divisional line between the Bára and the Sakaláva tribes.

Between Imedóngy and the northern parts of the Isálo mountain range it receives from the east the important rivers of Manantánana and Ranomáitso. According to Mr. Walen, in his paper on the Sakaláva, as contained in the *Antanánarivo Annual* for 1881, the Onymáinty appears to flow westward from the Isálo, under the name of the Mangóky, which falls into the Mozambique Channel, near Kitombé.

Concerning the divisional line already mentioned, it may be traced from seven or eight miles west of Ambósitra, down the range of hills as far as Nandehízina, the hills west of Ikingáro, keeping to the westward of Ifanjakána, the eastern edge of the valley of Ikalamivóny, crossing the Matsiátra at Analatsóy, and keeping to the west of the plain of the Manambónarivo, the ridges of Ilamboánana, and along the hills, through Ivohibóry, Isáisotsa, Iváry, and Ifótsihíra. All my natural history investigations point to the conclusion that this is a well-defined divisional line, on either side of which are characteristic floras and faunas. It will also be found that with one solitary exception in Betsiléó and another in the Bára, east of this line is entirely free from Malagásy fever, and that west of it fever is common in all districts. The mountain ranges, both in Betsiléó and Bára, are distinctly marked, and run very nearly north and south, being all, without exception, composed of huge granite masses.

The following journeys were taken in preparation of the sketch-maps now submitted to the Society. In 1876 a visit was made to the northern Tanála, then ruled by Queen Ihóvina. Journeying from Ambósitra southward we crossed through the central part of the Nandehízina forest, and rested for the night at Ivátotsílo, a small village situated on a hill on what might be called debatable land between the Tanála and Betsiléó; we found the village empty, as the inhabitants had fled at our approach. The night was exceedingly cold, and when we rose in the morning the hill was covered with hoar-frost. The want of food, together with our disagreeable night, so disgusted my palanquin bearers that they deserted me; we were, however, able to continue our journey onward to Andráina, where I was fortunate enough to get other bearers. From this place we entered Tanála proper, passing the villages of Ambohipéno and Ambohimilánza in the forest, descending to Ambohimiera on the banks of the Mananonaka; from this we passed in a northerly direction as far as Ambohimánga, the residence of the queen. From this town I journeyed to the north and east, visiting Ambohimánitra and Ambodiára, in order to trace the river Manandriána. While at Ivohimánitra I made the ascent of the mountain Isahazávona, from which a magnificent view was

obtained of the whole Tanála country and the greater part of northern Betsiléó. This mountain, which was of great height, had formerly been the stronghold of this part of Tanála, and on the summit there were still the remains of the town with its rude fortifications.

In returning to Betsiléó from Ambohimánga we journeyed northward, crossing the rivers Manandriána, Maintináandro, Isandrakáandro, and ascended into the high land at Ivohitrámbo, near which the river Mananzára has its source; from this we crossed the plain to Ambósitra. In 1877 I made a more extended journey. Leaving Fianárantsoá we passed through Alakamísy, and, crossing the head-waters of the Inamórona, descended through the forest to Ranomafána (hot springs), in the Ambodiráno district. Journeying from this straight eastward, we arrived in four days at Ivátovávy, a lofty and conspicuous mountain not far from the sea-shore. We made an ascent of this mountain in order to get a view of the country and to take bearings. Unfortunately, however, after a difficult ascent, we found ourselves enveloped in a dense fog. From Ivátovávy one day's journey brought us to Itsitósika, the government town on the Mananzára river, and from this place we went down the river to Masondráno, journeying northward along the sea-coast, visiting on our way the towns of Imahéla and Tanandáva as far as Andónaka. From this place we returned to Masondráno, and from it southward as far as the river Faráony, up which we journeyed. Keeping the northern side of the river we ascended it into the highlands near Anjólóbáto. From Anjólóbáto, passing through Ifándranáva, we reached Fianárantsoá in one day. In the following year a visit was made to the district of the chief Ratsiandraófana. This chief is one of the few who have been able to maintain their independence of Hóva rule. He is head of the Zafirámbo family, from which the principal Tanála chiefs are taken. From Fianárantsoá we went south-east to Imahasoabé, and entered the main forest a few miles to the east of that town, emerging from it at the village of Anáviávy. We passed southward from this through the districts of Isándrabé and Imarohála, crossing on our way the river Sandranánta, and skirting the base of the celebrated mountain of Ikóngo, we entered the forest at Atsimivóha, and emerged to the south of Irátra, round the western base of which we passed, returning to Fianárantsoá by Ivohitraféna.

The next journey of importance made was to the districts of Ivohitróso and Irianánana. From Fianárantsoá we passed southward by the west of Imedóngy and Itsitondroy, entering the forest near Ilómoka and emerging from it near Ivatolávo. From thence we journeyed down the valley as far as Ankaróvana, from which place we turned southward to Isanaráha, and from that hill down to the valley of the Irianánana. Journeying up this valley a considerable distance, we entered the forest at Ankísitra and emerged from it about 10 miles south of Imahazóny,

through which town we made our return to Fianárantsoa. These with other two short journeys to Ivohitréso and Anjôlobáto, comprise all my travels in the Tanála district, during which the bearings were taken and the survey made.

The Tanála country lies between $47^{\circ} 30'$ and $48^{\circ} 30'$ E. long., and between $20^{\circ} 15'$ and $22^{\circ} 30'$ S. lat.; as its name implies, it is nearly all covered by forest, comprising the great forest on its western side from which there run out broken and irregular patches as far as its eastern limit. In the great forest there are few villages of any importance, and the great bulk of the inhabitants are settled in the low country east of this forest. The sides of the great step on the eastern edge of the table-land is very precipitous, and many bold and rugged mountain sides appear to the east, the most conspicuous of these mountains, many of which are to be seen from the coast, are Ivohitrámbo in the north, Isahazávana, Ivohibé, Ivohibáto, Ivohibasiana, Ambóhitrandriana, and Ikóngo. The country is well watered and exceedingly fertile; sugarcane and rice grow in great luxuriance, and on the hillsides coffee is well-grown and productive. The northern part of the Tanála, in the district of the head-waters of the Mananzára, is subject to the Hóva government, and is ruled by a Tanála chief resident at Ambóhimanga. This district is divided into eleven sections named for the most part after the rivers that flow through them. With the exception of the towns Ambohimiera, Ambohimanga, Ivohimánitra, Ivohitrandriana, and Ivohitrámbo, the remainder are occupied by a migratory population, who shift their villages from year to year, according as they remove to other rice-grounds. The manner of rice cultivation requires that this should be done; as instead of planting it in regular fields and irrigating these, they simply cut down some brushwood on the hillside, and burn it on the ground before the rainy season, and on this their rice is sown. They seldom remain two seasons in the same place. The same custom prevails all through the Tanála with few exceptions, and these generally near the residence of the chiefs.

From the Faráony southward the country is virtually independent, and is under the rule of the Zafirámbo chiefs. The head of this family, Ratsiandraófana, maintained a long and successful resistance to the Hóva soldiers, taking refuge in his stronghold, the almost impregnable mountain of Ikóngo. He was able to defy the large army of trained men which was brought against him.

On the summit of this mountain, which is comparatively flat, there is a large town, and many rice-fields well watered by a stream of considerable size. There are, however, no residents except the guards, who are changed annually. There appears to be no ascent except by long ladders of creepers which are let down and drawn up by the garrison.

They are exceedingly jealous of this mountain, and no stranger is allowed to ascend it. Ratsiandraófana rules over the Isandrabé and the

Imarohála, but the kings of Imanambéndro, Ivohitróso, and Imananáno are subject to him. The Irianánana district, which is perhaps the most populous of all the Tanála tribes, is occupied by the people called Ampidóngy, who revolted some thirteen or fourteen years ago against the Zafirámbo dynasty, and have formed themselves into a small republic, ruled by a few petty chiefs. South of this division there is the Ampelafá and the Taivéndro, but these, although belonging to the same family as those already mentioned, are not reckoned as being pure Tanála. The family of the Zafirámbo do not claim to be natives of the country, and in all public declarations this is generally stated. Their origin is very uncertain, but they claim to be the descendants of a family of adventurers who at one time settled on the east coast.

From these adventurers came the Zafimanély, who now rule over the greater part of the Bára, and the Zafiramaníá, who rule over the coast tribes at Mananzára and Mahasóra and the Zafirámbo already noticed. These families of rulers claim for themselves the sole right of taking life, both of animals and men, and as a sign of royalty they only are permitted to wear the red cap and use chairs. They generally intermarry amongst themselves, and hence by mutual help they maintain supremé authority over the Bára, Tanála, and south-eastern tribes.

The country of the Tanála consists of undulating hills, for the most part covered with trees, bamboo, and the cardamon plant; the valleys between the hills are often marshy, but in many places they afford pasture land for the herds of cattle. Towards the south, more especially near the Ampelafá and Taivéndro the country is comparatively free from forest, and from the hill of Isanaráha it has the appearance of undulating grassy hills, and this is the reason why these tribes are not properly considered as Tanála or forest dwellers. Those who have settled in the great forest, such as the Imahasíla and those about Anjólóbato, are wood-cutters, while those on the western edge of the great forest are for the most part workers in iron, which is found in great abundance all along that district. Those in the low country have no particular occupation other than the formation of their rice-grounds, hunting the wild boars, and collecting honey with which to make their native beer. The whole country from the north to the south is remarkable for the beauty of its scenery. The deep valley of Ivohitróso is perhaps the grandest and loveliest of all; here the principal feeders of the Matitánana emerge from the forest into the low country, forming in their descent cascades and waterfalls of great grandeur and beauty, and the main stream of the Matitánana itself bursts from the green shades of the forest with a perpendicular fall of 500 or 600 feet, its dense columns of water being broken into clouds of misty spray long before the deep pool at its base is reached. Over this pool, sacred to the natives from their superstitious ideas, there is spanned many a gorgeous rainbow born of the bright sunlight and the misty vapours of the fall. These falls I

have named the Victoria falls; those at the head of Faráony river near Anjolóbáto the Cecil falls. Near the eastern base of the hills, near the Inamórona river, there is a hot spring, close to the falls of that river, which at the time of my visit had a temperature of 112° F. as compared with the atmospheric temperature of 70° F. On the north of the Matsiátra near Ivohibóla we have another hot spring, and close to the village of Imanámpy there is a third, and in the Bára land we discovered another about five miles east of the Government town Tompánan-drarána. The precise situations of these hot springs are $47^{\circ} 38'$ E., $21^{\circ} 10'$ S.; $47^{\circ} 18'$ E. by $21^{\circ} 16'$ S.; $47^{\circ} 5'$ E. by $21^{\circ} 47'$ S.; $46^{\circ} 23'$ E. by $22^{\circ} 20'$ S. Notwithstanding these springs, I was unable to discover any distinct traces of volcanic action. The hills of Betsiléó and Tanála are largely marked with seams of white quartz and patches of decayed granite of milky whiteness. The western edge of the great forest is a deposit of iron ore, and I have no doubt that gold exists in great quantities in the beds of the Tanála rivers. All the iron and pottery work of the Tanála people is manufactured in Betsiléó, and is obtained in exchange for soft rush-mats and bark-cloth, the latter of which I was told by the late Dr. Hildebrandt, to whom I showed a specimen, bears hammer marks similar to those seen in the same material from Central Africa. The Tanála houses are made of bamboo, split and flattened; they are generally a few feet above the ground. All the Tanála proper content themselves with folded leaves of the cardamon plant for spoons and drinking cups, this being one of their peculiarities, which distinguishes them from the Ampelafá and the Taivóndro. They are a peaceful and hospitable people, kind and bounteous towards the stranger; they have but little knowledge of money, and prefer an exchange for their produce—beads or calico. Like most of the tribes in Madagascar they practise the rite of circumcision, and trial by ordeal is very common. Serious crimes are rare, and within the last twenty or thirty years, few, if any, have occurred; capital punishment is almost unknown. In the northern Tanála the seat of justice is at Ambohimángá, and to this place all cases must be taken. In the southern Tanála, however, Ratsiandráofoana himself, with his judges, visits the place where the crime has been committed, and there pronounces judgment. The Tanála is, I think, the richest district in Madagascar, and presents a magnificent field for European enterprise in the cultivation of coffee, sugar-cane, vanilla, and even tea. The rivers are generally much impeded by cascades and boulders, and are only navigable for canoes or small boats for twenty or thirty miles inland; they generally flow into the lakes, with outlets to the sea full of sand and only suitable for lighters.

In close relation with the Tanála are the Bára, ruled over by the Zafimanély. These occupy the high land in the southern part of the central plateau. My journeys amongst these people were made in the

autumn of the year 1880, and the outlines of these are given on the map. Previous to this time I had endeavoured, with the assistance of others, to make a map of that country, but found that the data which they returned to me were altogether insufficient. First of all I sent a native as far as Tompánandrarána, with instructions as to the use of compass and other instruments; his returns were put upon paper and the result was chaos. Following him I advised a missionary and a deputation who visited the same town to take bearings on the route with my compasses. At first sight their returns seemed satisfactory; but there arose a great stumbling-block in the hill or upland of Ilamboánana, which covers an area of nearly 200 square miles. Nothing definite had been marked as to this hill, and the fruit of their labours had to be added to the chaos of their predecessor. Another traveller had wandered through the Bára, westward by the Isálo and down to St. Augustine's Bay; but on his return any geographical notes that he may have taken were lost in the general pillage of his goods.

In this state of matters I determined personally to visit the province. My first journey took us southward to Ambóhimandrôso, westward and southward to Iandraina, and thence down the eastern side of the mountains of Ivávárana and Itsiázombórana, in the districts of Isahanámbo, and skirting the northern part of the Menaráhaka, we passed westward by Iraikétampanány to Tompánandrarána, the government station, from which, passing a short distance down the valley of Ihósy, we ascended on to the Ihórombé or great desert, across which grassy waste we journeyed two days until we reached the Isálo mountains. Returning by the same road across the desert we diverged to the southward, a little to the east of Tompánandrarána, passing up the valley of Isahambángo, and skirting the plain of the Menaráhaka. We reached our furthest limit to the south near Ráno-tsára, on the borders of the Taivóndro. On our return the course was north-east, past Isáisotsa as far as Ivohibé; then bending northward over the high land we descended to the marshy valley of the Menaráhaka, from which, passing up the valley of Behásy, we joined our former course, a little south of Itsaranóro. While upon this journey we had found continual evidence of the unsettled condition of the people, so that I was not surprised when shortly after our return numerous cattle raids were made into the Betsiléo province. As these continued, it was thought desirable that I should visit the northern and western Bára, to see what could be done towards preventing their farther extension. Leaving Fianárantsoá we journeyed westward by Ifarénena, Ipáka, and to the north as far as Analatsóy. From this a few miles south-west took us across the river Manantánana, near the Ibára village of Imarozáza. From this we proceeded north-west to Inosifito, so called from the numerous islands that occur in the river, and thence journeyed in a westerly direction by Imelolóha and Imahasóa as far as Itsitondroy, the residence of the king of North Manongá. Leaving this place we journeyed to the south-

east for two days and a half, for the most part over desert plains, as far as Itamiá; half a day's journey east across the plain of the Ranomáitso took us to Itsifóhy, and from this two days' walk towards the north-east, passing over Iharamiláza and Ilavatsára, brought us to Fianárantsóa.

The most striking mountain range in the Bára land is that of Menaráhaka, which, rising into prominence in 22° lat., runs southward as far as $22^{\circ} 30'$. These mountains are unlike any others that I have ever seen on the central plateau. They present nothing of the rounded forms which characterise the mountains of Betsiléo and Imérina, with their sharp and rugged peaks rising thousands of feet almost perpendicularly. They form a grand and awe-inspiring sight; the principal mountains in this range are Iváravárana, Imaroafó, Itóitrano, Iaritséna, and Ivohibé. This latter is the most southern part of the range, and on it Raibúha, the king of Isántsa, has his stronghold, from which he has on many occasions defied the Hóva power. The rivers which rise near this mountain range are the Manambólo, the Tsimandáo, the Menaráhaka, and Ranoména on the west, the Irianánana and Manambavá on the east. With the exception of the marshes of Menaráhaka and those of the valley of the Ihósy, the country is composed of dry barren uplands, in some places entirely desert. The people are scattered, dwelling for the most part in the valleys by the river banks. Rice is cultivated to some extent in the eastern part of the province, but in the west the food of the people consists of a kind of arrowroot obtained from the root of *Tacca pinnatifida*. The principal river in the Bára country is the Menaráhaka; it takes its rise in the hills of the same name, and flows into the valley of Iroká in a succession of marshes, where it receives the small river of Ibehásy; it thence winds round to the north-west as far as Iváto, and afterwards southward for about 20 miles through a lovely valley as far as the mountain of Imenavála, where it receives the large river of Isahambánga, and those which drain the eastern side of Ilamboánana. The course is now south-east for about 30 miles through a wide plain, until it enters the mountains in the south of Isántsa, where it receives the Ináivo, a large and important river, and Ranoména which rises very close to the source of the Menaráhaka, and flows directly south round the mountain of Ivohibé to its junction with the main stream entering the forest. This magnificent river takes the name of Mananzára, and flows eastward to the sea near Vángaindráno.

The next river of importance is the Ranomáitso, which drains the northern part of the Bára country. This river, under the name of Tsimandáo, rises near the mountain Iaratséna, and flows northward for about ten miles. Coming through the Menaráhaka range of mountains north of Iváravárana, it then flows eastward through the wide plain of South Manongá, where it receives the name of Ranomáitso. In its windings through this plain it receives many small tributaries from the north, while on the south it receives the river Ihósy, to the north-west of Ivohibé, and then, flowing westward, it joins the Onymáinty, about

thirty miles to the north of the Isálo range. The only river that we crossed in the great stretch of the Hórom-bé desert was the Hazompótsy, which was flowing in a south-westerly direction. This river is said by the natives to fall into a Mangóky river, which in turn falls into the Oniláhy river, which empties itself into the sea near St. Augustine Bay. The Manantánana river is another of considerable importance rising near the mountain of Irátra. It flows southward by the government town of Ambóhimandróso, from which it flows northward as far as Anosiláva; winding a little to the south-west it passes out of Betsiléo, and then for a distance of about thirty miles towards the north it forms the boundary between the Betsiléo and Bára provinces.

Near to the mountain Ambólo, it winds westward through the North Manongá, and from Itsitondróy it tends southward for over thirty miles when it falls into the Onymáinty. The Manambóniarivo district is a great plain, mostly desert, through which the river Ranomáitso flows; the South Manongá is hilly and mountainous; the Sahanámbo and Menaráhaka occupy the valleys west of the great mountain range; the principal part of the Isántsa consists of the plains through which the Menaráhaka and the Ranoména flow, but the bulk of the population reside near Ivohibé; North Manongá and the Mandrápaka districts are hilly and generally barren; the Bára-bé district is mostly occupied by the desert of Hórom-bé—the inhabitants are settled in the valley of Ihósy and to the east of the Isálo mountains. The desert is a high bare upland, very nearly level, and is about forty miles across from east to west; the natives say that it stretches for many days' journey to the north and south. The whole of the Bára land, with its many hills, is composed of granite, and no trace of any other rocks are met with until near the edge of the desert; here, in longitude $45^{\circ} 30'$, a slight descent brings us to a very recent formation composed of terraces of soft clay and shale; these terraces are very distinctively marked, and show that at no remote period this part of the country had been occupied by an extensive lake. The Isálo range consists of soft sandstone and rocks, rich in fossils. The summits of the hills are generally level, and the rivers which come through the range have cut for themselves deep gorges, almost perpendicular, in their sides. Such a sudden change in the geological structure of the country no doubt points to a considerable change in its flora and its fauna, but as I only remained there for one day, which was fully occupied by other business, I was unable to make any extensive collection.

I trust, however, that we may be able to make a survey of the country around these hills, especially towards the west and south-west; as I believe that we shall be enabled to make such a collection of fossils and natural history specimens as will enable us to come to something definite as to the history of this wonderful island. Such a survey could be made at comparatively trifling expense—five or six hundred pounds would no doubt cover the whole.

The people of Bára are very unsettled, but are kind and obliging to strangers, and no danger need be apprehended in visiting their country.

The Ibára, Betsiléó, and Tanála are of the same origin—African—and are very distinct from the Hóva. Nearly all that has been written about Madagascar relates to the Hóva and their country, the province of Imérina, and consequently most of the endeavours to trace this people to a Malay origin is based on the language, customs, and appearance of this tribe. Now the Hóva and Betsiléó are as distinct as a Hindoo and a Chinaman, and in any attempt to account for the origin of the inhabitants of Madagascar we must take into consideration the Betsiléó character as well as the Hóva.

I submit that the Hóva are without doubt of Malay origin, but I as strongly hold that the Betsiléó and the aboriginal tribes of Madagascar are of African descent. All the anomalies as to language and customs are not difficult to explain, but they lie outside of a purely geographical paper such as this is. We at present know but little of western Madagascar; all or nearly all of our knowledge relates to the eastern division of the island, its people, its flora, and its fauna. The western part yet holds its rich treasures for the naturalist and other men of science. As one who has lived in constant intercourse with these outlying tribes, as one to whom their language and peculiar customs are well known, and who has enjoyed the confidence of all the chiefs in the Bára and Tanála districts, I can assure to all travellers a hearty welcome and assistance. In all my travels I have met with nothing but kindness and attention.

It will be observed that in the foregoing rough and very general description no reference whatever has been made to the heights of mountains or table-land. This arises from the fact that I had no instruments suitable for taking such observations; but I sincerely hope that in all future explorations and surveys which I may be permitted to make in southern Madagascar such instruments will not be wanting; also that the result of my labours will be of a more satisfactory character than that which I have now laid before you.

ROUTES IN TANÁLA AND BÁRA.

Ambositra to—	Miles.	Direction.	Description of Country.
Nandehizana	20	S.	Over grassy plains; cross river Ivato, fordable.
Ivátotsilo	10	S.	Through forest and over grass-covered hills.
Andráina	12	S.E.	Cross head-waters of Fanindrona, narrow but deep; grassy hills.
Ambohipeño	6	E.	Through shrub and forest.
Ambohimilánza	2	N.E.	Beautiful forest.
Ambohimiera	9	N.E.	Forest; steep descent.
Ambohitánana	7½	N.E.	Cross Mananonaka river, shallow; through bamboo shrub and forest; cross Vangana river, canoes.
Ambohimángá	10	N.E.	Through country with forest patches; cross Isahanafó river, shallow; road bad.
	76½		

ROUTES IN TANÁLA AND BÁRA—*continued.*

	Miles.	Direction.	Description of Country.
Ambohimánaga to— Ivohitrandríana ..	18	N., N.E.	Cross Manandríana, canoes; valley of Mananzára; cross Imaintandro, canoes.
Ivohitrámbo	22	N.	Through broken forest; ascend in forest to high land.
Imady	15	W.	Through forest and over grassy uplands.
Ambositra	8	W.	Grassy hills.
	63		
Fianárantsoa to— Alakamisy	17	N.E.	Over grassy hills and plains; cross Matsiátra, canoes, but fordable in dry season.
Ivatotatana	13	N.E.	Over grassy plains, with shrub.
Ranomafána	14	E.	Over grassy plains, cross head-waters of Inamórona; dense forest; steep descent.
Ambalafasana	25	S.E.	Down the wooded valley of Inamórona.
Ampasimpotasy	19	E.	Through wooded valleys, crossing many streams.
Imaravavy	9	E.	Wooded valleys.
Ivátovavy	18	E., S.E.	Wood valleys; rapid descent; high hills on left; leave forest for open country.
Antanambao	14	N.E.	Grassy plains.
Itsitósika	12	N.E., N.	Grassy plains, with patches of wood; cross Mananzára river, canoes.
Masondráno	10	E.	By river in canoe.
	151		
Masondráno to— Ambaniefaka	9	N.	Along sea-shore.
Imahela	8	N.	Along shore; cross two outlets of lakes to sea in canoes.
Tapandáva	5	S.W.	By canoe on lake.
Ambohetsara	12	N.	Along sea-coast; cross one outlet of lake in canoes.
Anosivarika	25	N.	Along sea-coast.
Andouaka	6	N.W.	Through heath shrub; cross lake and river Fanavelo in canoes.
	65		
Masondráno to— Ambalavotaka	9	S.	Through shrub and forest; cross lake in canoes.
Imarohita	8	S.	Over open country a little from sea-coast; cross lake in canoes on leaving Ambalavotaka.
namórona	15	S.	Grassy plains with forests, west of lakes; cross lake near Imarohita, and the river Inamórona in canoes.
Ambotaka	20	S.	Over grassy plains, and several deep water-courses.
Tanambao	15	N.W.	Up valley of Faráony; open grassy country.
Ivohimánitra	8	S.W.	Grassy country, with forest patches; cross Faráony in canoes.
Imahamay	12	N.W.	Up wooded valley of Faráony.
Ivohimánitra	24	W.	Wooded valleys and grassy hills.
Ambohimangakely	10	N.W.	Forest and wooded valleys; cross Faráony river.
Anjólóbato	11	N.W., W.	Forest and wooded valleys; high mountains in front.
Ifándranáva	18	W.	Ascend to high land through forest; grassy plains, with several marshy streams.
Fianárantsoa	15	N.W., W.	Grassy hills and plains; cross Matsiátra in canoes.
	165		

ROUTES IN TANÁLA AND BÁRA—continued.

Fianarantsoa to—	Miles.	Direction.	Description of Country.
Imahasonabe	18	S.E.	Grassy hills; cross Matsiátra in canoes.
Anaviávy	25	S.E., E.	Grassy hills; marshy valleys; dense forest; rapid descent.
Imaromiandry	12	S.	Along pleasant valleys; wooded hillsides.
Ambobimitsivalana ..	8	W., S.	Grassy plain and wooded valleys; cross several streams.
Itsimvoha	20	S.	Over mountain ridge; cross river Sandrananto and wood valleys; high mountains on the right.
Ankaranomby	17	N.W.	Ascend to high land through dense forest; grassy country.
Ivohitraféno	15	N.	Cross wooded ridge; descend into valleys well wooded; and cross grassy plain.
Fianarantsoa	20	N.N.W.	Grassy plains.
		125	
Fianarantsoa to—			
Imedongy	17	S.	Grassy plains.
Itsitondroy	12	S.	Grassy plains and hills.
Ivohidroa	5	S.W.	High hills and rough valleys.
Ilomaka	10	S.E.	Grassy plains; marshes; cross Manantánana.
Ivatolávo	15	S.E.	Forest; sharp descent.
Ankarovana	8	E.	Down the wooded valley of Matitánana.
Isanaraha	7	S.	Along wooded mountain spurs.
Ibetafo	6	S.	Crossing open valley of the Irianánana.
Ivohetromby	20	N.W.	Ascending valley of Irianánana.
Ankisitra	11	N.W.	Ascending valley of Irianánana, sharp ascent.
Imahazony	22	N.	Through thick forest, and over grassy plains.
Fianarantsoa	30	N.	Grassy plains and valleys.
		163	

ROUTES IN BÁRA.

Fianarantsoa to—			
Ambolimandroso ..	26	S.	Grassy valleys and cultivated plain.
Imanampy	6	W.	Cultivated plain.
Imandraua	5	S.W., S.	Through rough narrow valleys.
Itsarano	12	S.W., S.	Through valleys, with high mountain range on the left.
Antananarivokely ..	2	S.W., S.	Up rough valley into an open grassy valley.
Ivato	8	S.W.	Across ridge into the lovely wooded valley of Ivato.
Andavakaondry ..	10	S.W.	Along valley of Ivato.
Iraikéampanany ..	15	W.	Through wide valley, with a great plain stretching to the south.
Tompánandrarána ..	16	W.	Wide open grassy plains.
Ranohira	45	W.	Down valley of Ihosy; ascend to high land, and across desert.
		145	
Tompánandrarána to—			
Ambatosolo	13	E. and S.	Through valley between the hills, and a fine valley wooded.
Ibekily	14	S.E.	Cross into valley of Sahambanga; populous; wooded.
Ránotsara	20	S.E.	Cross over hills, and along the bare open plain.
Istaisotsa	18	N.E.	Winding through the hills; cross river Mennaríhaka.
Ivohibé	14	N.E.	Open valley to south; hilly uplands to north; cross river Ranomena.
Menaríhaka	12	N.	Over high grassy uplands; descend into marshy valley.
Antananarivokely ..	6	N.N.E.	Up rough valley of Behásy.
		97	

ROUTES IN TANÁLA AND BÁRA—continued.

Pianántsóa to—	Miles.	Direction.	Description of Country.
Ifilangana	7	W.	Over hilly uplands; grassy.
Ifarénana	3	N.W.	Over range of low hills into cultivated valley.
Iakarana	4	N.W.	Over grassy hills and rough rocks.
Ipáka	2	W.	Over grassy hills; descend into narrow valley.
Analatsóy	8	N.W.	Winding among grassy hills, and along bank of Manantánana.
Imarozáza	7½	S.W.	Along open plain; cross Manantánana, canoes.
Inosifito	9	N.W.	Open grassy plain; wooded mountain and valley.
Imeloloha	14	W.	Open plains, barren.
Imahasoa	18	W.	Over hills, and along open plain.
Itaitondroy	4	W.	Open plain.
	76½		
Itaitondroy to—			
Iangonarivo	7	S.E.	Up the banks of small stream; wooded.
Ambóhitrandragána	15	S.E.	Over bare barren hills.
Ifosamainty	16	S.E.	Across open plain; nearly desert.
Imarangavato	5	S.E.	" " " "
Itamía	6	S.E.	" " " "
Itsifóhy	8	E.	" " " "
Iharamiláza	10	N.E.	Over bare hills covered with grass.
Itondotsa	7	N.E.	" " " "
Ilavatsára	9	N.E., N.W.	Over grassy hills, and across several valleys.
Pianántsóa	20	N.E., E.	Hilly uplands; grassy.
	103		

The PRESIDENT, in introducing the subject of the evening, said it was not often that the Council were able to procure for the Society a paper on a region so new as the southern interior of Madagascar. Many of the papers that had been read of late years were rather elucidations of discoveries already made than accounts of travels into unknown countries. It might be said that Madagascar was a known land, but that was true of only a very small portion of the island. He believed that Mr. Cowan would tell them that not above one-third of that immense island had been visited by Europeans. After spending some time in the well-known parts, Mr. Cowan settled among the aboriginal tribes on the extreme verge of the territory belonging to the Queen of Madagascar, and from there he was able to make observations on a country of which so little was known. He was a member of that profession to whom the Society owed so much. He pursued the highest calling of carrying the Christian faith to barbarous tribes, but at the same time he observed everything with a keen and cultivated eye, and was able, while performing the primary duties of his important office in a most efficient manner, to add to the geographical knowledge of the regions which were the scene of his labours.

The following discussion ensued after the reading of the paper.

Mr. SCLATER said he had listened with great interest to Mr. Deans Cowan's explanation of the principal physical features and the different tribes of Central Madagascar, and he cordially wished him success in endeavouring to obtain the aid of the Geographical Society in extending the area of these investigations. But he must remind them that they had to thank Mr. Cowan not only for the discoveries of which he had just given an outline, but also for an extensive collection of specimens of the flora and fauna of Madagascar which he had brought home. Several papers of very great interest had been communicated to the Zoological Society, principally by assistants in the Zoological Department of the British

Museum, relating to the animals brought back by Mr. Cowan. The fauna and flora of Madagascar were of very special interest to the students of geographical distribution. They were perhaps more peculiar than those of any other limited part of the world's surface. Those who wished to get an outline of the present views of naturalists upon this subject could not do better than refer to Mr. Wallace's book lately published, called 'Island Life.' According to Mr. Wallace's theory, Madagascar must have formed part of the African continent in a far-distant epoch when animal life in Africa was very different from what it was at the present moment. Africa was now tenanted by many different species of monkeys: in Madagascar, on the contrary, there were only lemurs. The finest, and largest antelopes also were found in Africa, where there were sixty or seventy species; but there was not a single antelope in Madagascar. In that large island, however, there were most peculiar types, such as the Aye-aye in the class of mammals, and many strange types of birds. Among reptiles too there was the Chameleon, of which he believed Mr. Cowan had discovered two or three new species. In the vegetable kingdom Madagascar contained also many peculiar Orchids and other plants. Owing to these circumstances, the island had long been a favourite ground of exploration for naturalists. The Dutch work by Pollen and Van Dam, founded upon collections formed there, had been until lately one of the principal authorities. In France, too, M. Grandidier had begun to issue a magnificent series of volumes containing a complete account of the island. Nor had English explorers been altogether wanting, for many discoveries had been made by them. But although so much had been done, more remained to be accomplished, particularly in the outlying provinces. They had to thank Mr. Cowan for having considerably added to the collections of the national museum in this respect, and he was sure they would all join with him in thanking him for what he had told them, and for the collections he had brought home.

Sir GEORGE BOWEN (Governor of Mauritius) said he had no personal knowledge of the vast and mysterious island of Madagascar, one of the very few parts of the world which still opened a nearly virgin field for the explorations of the Geographical Society. But neither of the speakers had said anything about the political state of the island. The Governor of Mauritius had always been in certain political relations with the Hovas. From his official correspondence with the English Consul in Madagascar, and his conferences with a great many people who had been to Antananarivo, he had conceived the idea that the Hovas occupied in Madagascar the same sort of position with regard to the other inhabitants as the Spartans did with regard to the Lacedæmonians in ancient Greece, the Magyars in Hungary, or the Sikhs in the Punjab; that they were in fact the conquering race, and were gradually extending themselves, and would ultimately subdue the whole country and form a great and compact kingdom. Mr. Cowan had complained that the reigning dynasty made no roads between the capital, which was on the central plateau, and the coast. He had good reason to believe that that arose from what was perhaps a not altogether unfounded jealousy of the possible entrance of European Powers into the country. On one occasion when there was a great quarrel between the Prime Minister of Madagascar, the husband of the reigning queen, and the Consul of a great Power, the latter said, "If you do not yield we will march an army to Antananarivo." "Oh," said the Minister, "there are no roads for you to advance over, but only a pestilential territory of low grounds: we have got two generals, Hazo and Tazo (that is Forest and Fever), and as long as we have them we will laugh at your armies." Of course that was not strictly original. The Emperor Alexander said something of the same kind to Bonaparte when the latter first threatened to march on from Moscow to St. Petersburg. Alexander reminded him that the two generals *Janvier et Février* he would find it difficult to cope with. Sir Henry Barkly had

had greater opportunities than himself of knowing the political position of Madagascar; but he had very little doubt that the reason why the people did not make roads to their seaports was that they were determined that Madagascar should not be the prey of European Powers. Already at Antananarivo they had something like 20,000 troops disciplined in the European fashion, principally by English officers. A former Governor of Mauritius sent a sergeant there who drilled them, and as far as he could make out the Hovas were now as far advanced in civilisation as the Russians before the time of Peter the Great. They were in a semi-oriental state with a little smattering of European civilisation, and it was most desirable that they should, without interference otherwise than by advice, be allowed to develop themselves.

Alderman HADLEY said he had had some experience of Madagascar, and was one of those who some years ago instigated a visit to this country by some representatives of the Government of Madagascar. At that time he hoped that results would have followed far different from those prevailing at the present moment. Still he did not despair in a political sense. He then strongly urged upon the Queen and the chiefs the making of roads to the capital, and he believed that they would yet be made. He also recommended the introduction of a coinage similar to the English. There were at Antananarivo buildings almost equal to any of the city of London. The people spoke the English language, and their influence would spread not only towards the southern and western, but to the northern provinces. It might be taken as certain that the governing power would be the Malay or Hova element. The island was full of everything which could make a country great if properly administered, but as Sir George Bowen had said, it was at present in a state something like Russia in the time of Peter the Great. In the time of Lord Russell, under whose auspices he went out there, great interest was taken in the island, and he hoped that something might yet be done politically with regard to the country. There was formerly a very great jealousy between England and France as to the control of the island, and he strongly recommended that it should be placed under a British protectorate. Had that been done there could be no doubt that now it would be under one central authority, and that the advancement of civilisation would have been of such a remarkable character as had not been previously seen in the history of the world.

Questions having been asked by Mr. H. B. ISCE and Mr. J. LEWIS,

The PRESIDENT, answering for Mr. Cowan, said he would remind the gentlemen who had put questions on matters which Mr. Cowan did not profess to deal with, that the author of the paper had apologised for making his remarks very general in their nature. He had authorised him (the President) to say that the Hovas, although undoubtedly the most intellectual and intelligent people in the island, formed at present but about one-fifth of the population. The whole territory governed by the so-called Queen of Madagascar, including that occupied by the two large tribes subject to her, was less than one-tenth of the whole island. The remainder was independent. Though the Queen claimed a sovereignty over it, it was practically not exercised. Whether it was desirable or not that the rule of the Hovas should spread was a question for consideration. One thing was quite clear. The inhabitants were an intelligent and, on the whole, a tolerably virtuous people, excepting apparently some of the chiefs, who were described as spending their time in intoxication. Indeed, there seemed a curious analogy between the fauna of the island and its inhabitants. Africa, from which Madagascar appeared to have been parted at a very early period, was the home of some of the largest and most destructive animals in the world, and a considerable portion of its inhabitants were extremely warlike and dangerous, and

sometimes bloodthirsty; but in Madagascar there appeared to be a singular lack of these dangerous animals, and at the same time an extraordinary innocuousness on the part of the population. Whether or not there was any connection between these facts he could not say, but it was not impossible that the people were harmless because their warlike instincts had never been called forth by the necessity of warring against wild beasts. He was sure they would all agree with him that a speaker of more graphic power than Mr. Cowan had seldom addressed the Geographical Society, and that he was well deserving of their thanks.

Notes on the Shaktú Valley, Waziristan.

By Captain G. F. YOUNG, Bengal Staff Corps, Deputy-Assistant
Quartermaster-General.

Map, p. 584.

THE Shaktú river issues from the Waziri hills and enters British India about 20 miles south of the frontier station of Bannu.

The Tochi (or Gambela), the Kaisor, the Shaktú, and the Tank Zam, all flowing through different parts of the Waziri hills, run, roughly speaking, parallel to each other in the order named, i. e. the Tochi is the most northern and the Tank Zam the most southern. Their courses are from west to east.

The valley of the Tochi is as yet only partially known or surveyed; those of the Kaisor and Tank Zam were visited in 1860 by General Chamberlain's force, and again this year (1881) by the columns under Generals Kennedy and Gordon.

The Shaktú had up to the present time remained entirely unknown, and the space between the Kaisor Valley and that of the Tank Zam was a blank on our maps. It is inhabited entirely by the Mahsúd Waziris, whose extreme jealousy of all other tribes has been an effectual bar even to native explorers. General Gordon's brigade in returning from the Ruzmuk Pass in May 1881, traversed its whole length, thus opening up an entirely new piece of country.

The Mahsúd Waziris.—The Mahsúds are the most powerful of the three main branches of the great Waziri clan, and are one of the most warlike, turbulent, and independent of the frontier tribes. The other sections of the clan hold the Mahsúds in considerable awe, and are consequently looked upon with much contempt by the Mahsúds themselves.

The Mahsúds do not appear to be so much given to intertribal feuds as other clans, and it is a noticeable fact in the Shaktú Valley that not only are the villages of four or five different sections of them considerably intermixed, but also that there is only one tower and two walled villages in the whole valley. They are as treacherous and

degraded as all other Afghans, but are brave and of splendid physique. Having few firearms, they fight principally with sword and shield and with stones, in the art of throwing which latter all of whatever age or sex are wonderfully expert. The sword is the short broad sword and not the usual Afghan knife.

Their repeated murders, cattle-liftings, and other raids on the villages within our border, culminating in 1879 by their burning the small frontier station of Tank, caused the late expedition to be sent against them just as had been done in 1860; and in May 1881, General Kennedy with the 1st Brigade advanced via the Tank Zam, while General Gordon with the 2nd Brigade advanced via the Kaisor, the two brigades meeting in the neighbourhood of the Ruzmuk Pass.

General Course of the Shaktú River.—The Shaktú river rises in the range of hills east of the Ruzmuk Pass. From its source eastwards to the small frontier fort of Jani Khel (Bannu district) is a distance of about 60 miles, but it is only in wet seasons that it reaches Jani Khel, generally becoming lost several miles west of the latter place in the wide stony plain which stretches along this part of the frontier.

From its source near the Niwál Pass, it runs south-east for about 16 miles through high steep hills; it then takes a sharp bend, widens considerably, and runs north-east for about nine miles. Thence for the next six miles it flows in a narrow gorge in which are two waterfalls. After emerging from this it continues for a few miles through a tolerably open barren valley, when it again contracts, becomes very tortuous, flowing between high precipitous hills, and at length emerges through "the Shaktú Tungi" (or gorge), after which it flows north-east for several miles along the base of a precipitous range of hills, and beyond Karkenwom separates into several channels and soon disappears, sinking into the stony frontier plain.

The Hills.—The hills which border the Shaktú Valley and separate it from that of the Kaisor on the north and of the Tank Zam on the south are barren ranges varying from 2000 to 8000 feet in height. The lower hills are almost entirely of conglomerate, which is the principal formation of the whole country, and they are all very destitute of trees, though in the upper parts of the valley they are often thickly covered with bushes of holly, &c. The range to the south is higher and more precipitous than that to the north, which latter has an inclination to spread out flat on the top.

The Sham Plateau.—On ascending the dividing range from the Kaisor Valley, a remarkable plateau was found on the top of the watershed. This is called the Sham and is a fine grassy plain, having an elevation of 6000 feet, and an extent, roughly, of $1\frac{1}{2}$ mile from east to west, and rather more from north to south; but several large side valleys opening into it make the actual extent of flat ground considerably more. It is the principal grazing ground of the Turi Khel and Mahmít Khel

(sections of the Darvesh Khel branch of Waziris) who bring their flocks here to graze about the month of June, and every possible attempt was made by them to prevent its discovery. The hills around the Sham rise 200 or 300 feet above the plain itself, and are covered with the dwarf oak common to all these hills. There are also a few fine trees scattered round the edge of the plateau. Streams both to north and south, the former flowing into the Kaisor and the latter into the Shaktú, are said to afford a steady supply of water throughout the year.

The plateau slopes imperceptibly towards the south, and at its lower end a stream, which takes its name therefrom, has its source. The latter flows for several miles southwards through a wide open valley until, after being joined by the Larai stream, it enters a deep gorge and descends to the Shaktú.

The route from the plateau follows the above-mentioned stream to the Larai Nulla, when it turns up the latter, ascends to a low "kotul" and descends thence to the village of Waladin.

The "Raghzaies."—A most noticeable feature throughout the whole Waziri country are the long flat-topped stony plateaux called *raghzaies* (or *rogho*). They are often of great extent and vary in height from 50 to 200 feet above the beds of the streams; they correspond to the similar feature seen in Kashmir, called *karewahs*, and undoubtedly mark what was once the bed of the valley; the streams have in course of time cut their way through this bed and now flow in wide deep-cut channels between high banks. The top of the latter, when ascended, proves generally to be the edge of a wide stony plain (a *raghzaie*), sometimes even taking the form of a long, low, flat-topped hill. The *raghzaies* are very seldom cultivated, being a mass of conglomerate.

The "Kutza" Lands, Crops, &c.—Throughout the country cultivation is confined to the pieces of alluvial land lying along the edges of the streams below the high *raghzaie* banks, and called *kutza*. These *kutzas* are very rich, and produce two or three crops a year; they are a most prominent feature in the upper course of the valley, as being the only really valuable property in the whole country, and their importance is well shown by their all having names of their own, which is by no means the case of the villages which are mostly known only by the name of the tribe inhabiting them.

The crops are chiefly wheat and barley; they are measured by *kanals*, a *kanal* being one-eighth of an acre.

Roads.—Speaking generally, there are no roads, the tracks used as such being simply the beds of the streams. They are, however, not quite so bad as this fact might usually imply in a mountainous country.

With the exception of the gorge below Baromand the bed of the

Shaktú is a broad and, comparatively speaking, level road from 50 yards to sometimes as much as 250 yards wide, with an imperceptible gradient. It is certainly trying to the feet of both men and horses from being entirely paved, as it were, with large waterworn boulders and stones; but in a country where, if this did not exist, a difficult and dangerous hill-path would be the only alternative, such a route is a great boon. General Gordon's column was accompanied by some 3500 camels and 2500 mules, yet the column was able to advance about 10 miles daily, which could not have been the case on an ordinary hill-path. Iron is brought down in considerable quantities by this route to Bannu. Though the Shaktú has a fair amount of water in it, the latter flows in a number of small streams between the boulders, and so is no obstacle to traffic.

To avoid the waterfalls in the gorge below Baromand, the force halted there one day and cut a road over which the whole of the baggage-animals were passed next day.

The gorge lower down the river, the Shaktú Tungi, has no difficulty if not defended by an enemy. As regards other roads, that by which the force entered the Shaktú from the Kaisor Valley, viz. over the Sham plateau, &c., is a fair hill-path by which mules can travel easily. So also is the road by the Zeandai Algad towards the Kaisor Valley.

General Description of the Valley, from the Niwál Pass to Jani Khel.—For the first ten miles of its course the Shaktú, which rises at the Niwál Pass (height 7500 feet), is called the Showáli. In this part of its course are situated the village of Wurzoh, and the several Ummerzai settlements which do not appear to have any names of their own. They are surrounded by a fair amount of cultivated land, with a good many fine trees.

At Waladin, which is a miserable little hamlet of the Krach Khel section, the bed of the stream is about 70 yards wide, with a fair sized volume of water.

From Waladin to the mouth of the Sham stream are passed on the right bank two villages of the Shahabi Khel (whose chief settlement is on the lower slopes of the Shugush Mountains), and soon after, on the left bank, two villages of the Mirsangaie: each of these have several fine kutzas lying below them, and fringed with poplars and other trees.

The number of villages and amount of rich cultivated land in the Shaktú Valley was a complete surprise to us, it having been reported almost a barren waste. The villages are of the usual style of Afghan village, except that they are almost invariably without either towers or walls for defence: they are always situated on the high raghzaies overlooking the flat cultivated lands below, while behind them the hills rise steeply.

At the mouth of the Sham is the large village of Mir Kanai, or Mir Hussein, and a little beyond, on the right bank, the two villages of Sangér, called also respectively Kammolai and Shawal. Just beyond the latter village the Shaktú makes a sharp bend to the north-east. Here it opens out to a width of about 200 yards, receiving the tributary streams of the Shín Stargye Khula*, Náshpán, Barára Khula and Shishta, whose lower courses end in long flat plateaux, on which stand the villages of Khadari and Barára.

The Shín Stargye Valley is a fine open one, sloping gradually up to the foot of the Shugush, and there are said to be numerous villages at its upper end, as well as a fine open plain called Sharkai. The force marching as it did rapidly through the country, only halting for one day at Baromand, did not admit of these valleys being explored.

The next village passed is Kikarrai, with Shere Ali's tower, the only one seen in the Shaktú Valley.

This part of the valley is very wide, and in the next two miles are situated the four large kutas of Dirgai, Pézhizwom, Malwom, and Zhandrwom; the villages of Malwom and Zhandrwom are the only ones in the valley which are not inhabited by Mahsúd Waziris (see list of villages attached to the present notes).

Here the Shaktú makes another sharp bend round a small hill which lies right in its course. The stream is here a good strong one, and for the next 2½ miles flows in a very wide stony bed, between high precipitous (raghzaie) banks, which shut out all view of what lies behind.

Soon afterwards we pass Kikarrai, a large village encircled by a strong wall, and after another sharp bend reach Baromand (or Zéwar Kót), just beyond the mouth of the Shandzaie; here also there is a good deal of cultivated land. Two miles up the Shandzaie Nulla is situated the village of Pírgul.

At this point the valley contracts, and soon becomes a narrow gorge, in which (near the mouth of the Khaorai Nulla) are two small waterfalls—marked V and W on the map. This gorge forms the difficult part of this route, and, together with that lower down (the Shaktú Tungi), is relied upon by the Mahsúds as giving them immunity from all interference from the east. Our entire force was occupied one whole day in making a good road through this gorge.

At Baromand villages and cultivated land (with the exception of Mandrwom and Karkenwom) cease, and below this the valley is given up to marauding bands, chiefly of the Jalál Khel.

Emerging from the gorge, the large kutza of Mandrwom is passed—there is no village.

Below Mandrwom the river flows for several miles through a comparatively open valley; and soon after is joined by the Sheránna, a large tributary.

* *Khula* means "mouth of," and is often used as part of the name of a stream.

Below this the Shaktú becomes very tortuous, winding between high, precipitous, and rugged hills. Those on the north, called Karrai, are noticeable from the fact, that while their tops almost overhang the Shaktú, they form the watershed between it and the Kaisor, though the latter is about seven miles off; no water entering the Shaktú from this side.

At about nine miles below Mandrwom we reach the Shaktú Tungi (or gorge), caused by the stream piercing through a very precipitous rocky ridge. The strata here are very peculiar, viz. several narrow walls of rock parallel to each other, and at right angles to the course of the stream, which flows through a narrow gap in the "wall." In some cases the thickness of these "walls" is not more than four feet. They stand one behind another, like the side scenes of a theatre, and afford just the kind of position always sought for by an Afghan enemy, viz. perfect security up to the last moment, and then a safe retreat.

This gorge is the boundary eastwards of Mahsúd territory; shortly beyond it the Shaktú is joined by the Khraista, a broad river-bed paved with large stones, like the former, but with no water in it. This valley, in approaching from Jani Khel, appears to be the main one, while the opening of the Shaktú itself looks small and insignificant. The Khraista runs up to a *kotul* between the Gubbergurh and Bubbergurh hills, over which a path leads to Palosin, in the Tank Zam valley. The Khraista valley is quite uninhabited.

From here the Shaktú, whose bed is now about 300 yards wide, bends to the north-east, along the foot of a steep, rocky range of hills, which stand like an unbroken wall on the left bank. On the bank is a confused mass of low bare hills, lower spurs of the Gubbergurh, ending towards the river in a precipitous bank of conglomerate fully 100 feet high.

At five miles from the Shaktú Tungi, Karkenwom is reached, a large cultivated kutza like Mandrwom; but there is no village. About a mile to the north is a break in the range, through which a pass called the Kissonai leads into the Kaisor Valley, and shortly beyond this the Shaktú splits into a number of small channels and disappears, sinking into the dry stony plain. It is certain that throughout its course a great deal of the water sinks into the soil, as, notwithstanding the receipt of large tributary streams, such as the Sham, Shín Stargye, Barára, &c., it always remains about the same in quantity, and below Mandrwom sensibly decreases.

From Karkenwom the route runs for 11 miles over a wide stony plain to the small frontier post of Jani Khel, 16 miles from Bannu. The bare hills on the right gradually die away into the plain, which on the left stretches uninterruptedly for about 15 miles or more in width. At about three miles are passed some graves, and this point seems

commonly supposed to be the British frontier. Just before reaching Fort Jani Khel several dry nulla beds are crossed, into which in wet seasons some of the water of the Shaktú finds its way.

LIST OF VILLAGES IN THE SHAKTÚ VALLEY, WAZIRISTAN, showing Sections of the Mahsúd Waziri Tribe to which they belong. Commencing from the Niwál Pass at head of Valley.

Right Bank.	Niwál Pass.	Left Bank.
	↓	
4. Shalábi Khel, two villages (Shalábi Khel-Mahsúd).		1. Wurzoh. 2. Other Ummerzale settlements. 3. Waladin (Krach Khel-Mahsúd).
8. Sangér or Kammolai (Kikarrai-Mahsúd).		5. Mirzanzaie (Mirzanzaie-Mahsúd).
9. Sangér or Sháwal (Kikarrai-Mahsúd).		6. Rabistan (Mirzanzaie-Mahsúd).
10. Khadari (Kikarrai-Mahsúd).		7. Mir Kanai or Mir Hussein (Kikarrai-Mahsúd).
11. Barára (Kikarrai-Mahsúd).		
12. Kikarrai or Shero Ali's Tower (Kikarrai-Mahsúd).		13. Malwom or Moghul Shah (Turi Khel-Darvesh Khel (<i>not Mahsúd</i>)).
14. Zhandrwom or Gul Bayid (Turi Khel-Darvesh Khel).		
15. Mala Khel (Turi Khel-Darvesh Khel).		17. Pirgul (two miles up Shandzaie) (Turi Khel-Darvesh Khel).
16. Kikarrai Kót (Kikarrai-Mahsúd).		
18. Baromand or Zéwar Kót (Mirzanzaie-Mahsúd).		Mandrwom belongs to Abdullai-Mahsúd.
The Shaktú Tungi bounds Mahsúd Waziri territory.		
Karkenwom belongs to Turi Khel-Darvesh Khel Wazirs.		

New Villages in the Kaisor Valley.

1. The Kaisor Valley having been already partially surveyed in 1860 (when it was called the Khissorah), it has not been thought necessary to send any sketch of it, but the following new villages were not entered in the old map.

2. The Kaisor is a valley very similar to the Shaktú, running roughly parallel to it on the north at an average distance of 16 miles. It is entirely inhabited by the Turi Khel section of the Darvesh Khel branch of the Waziri clan.

3. Villages enclosed in brackets are in the old map, and are merely entered here to show relative positions. The distances from the Ruzmuk Pass are given for the same reason.

KAISOR VALLEY.

Right Bank.	Ruzmuk Pass.	Left Bank.
	↓	(Bazoni, 5 miles.)
2. Dosalli, 11 miles. (Sarobo, 16 miles. Musakki, 20 miles. Eti Ziarat, 21 miles.)		1. Khoni Zujarat or Zuide Ziarat, 10 miles. Wrongly placed in old map some miles further east.
3. Sandu Killi, two villages, 23 miles.		(Abbas Khan's tower, 24 miles.)
4. Ali Must, 24½ miles.		
5. Tota, 25 miles.		
6. Myadeen Khel, 25½ miles.		
7. Dakkai Burj, 26 miles.		
10. Karkanai, two villages, 29 miles.		
		8. The hill east of Abbas Khan is called Teapara, height 4800 feet.
		9. Wurmankai, 27 miles. (Seyn Ziarat.)
		11. The hill north of Seyn Ziarat is called Tarakai, height 3500 feet.

GEOGRAPHICAL NOTES.

Rescue of Mr. Leigh Smith and the Crew of the 'Eira.'—Sir Allen Young, in the *Hope*, arrived at Aberdeen on the 20th August, bringing Mr. Leigh Smith and the crew of the *Eira*, who had providentially escaped to Novaya Zemlya in their boats after wintering in Franz-Josef Land on the wreck of their vessel, and were picked up by the Relief Expedition. The *Eira* was severely nipped by the ice close to Cape Flora on the 21st August, 1881, and sank in deep water two hours afterwards, before the crew could rescue sufficient provisions to carry them through the winter. Happily sufficient walrus and bear meat was obtained not only to prevent their dying of hunger, but to pass the dreary months in health and comparative comfort. Their escape in boats was favoured by the large extent of open water—80 miles—met with on quitting Franz-Josef Land towards the end of June. Further details need not be here given, as an account of his voyage is in preparation by Mr. Leigh Smith himself.—One of the first acts of Mr. Smith, on his arrival, was to address the following letter of thanks to the Society :—

S.S. *Hope*, ABERDEEN, August 20th, 1882.

I have the honour to request that you will be so good as to convey to the President and Council of the Royal Geographical Society my deep sense of their great consideration in giving their generous assistance and support to the *Eira* Relief Expedition, and also to express to them the gratitude of the crew of the *Eira* for the timely relief afforded them.

I have the honour to be, &c., &c.,

B. LEIGH SMITH.

To the Secretary of the Royal Geographical Society.

The following is Sir Allen Young's report of his proceedings:—

S.S. *Hope*, ABERDEEN, August 21st, 1882.

SIR,—I have the honour to report, for the information of the *Eira* Relief Committee, that the *Hope* arrived at Hammerfest on the morning of the 3rd July. I at once proceeded to make inquiries for a suitable ship to act as a tender, and I eventually purchased the *Martha* sloop.

On the 8th July the *Martha* was completely equipped, including doubling for the ice, and having her own crew and provisions.

The *Hope* being also ready for sea we left Hammerfest on the morning of the 9th and proceeded through the Fiords to Tamsö, to fill up with coals from the hulk *Trafalgar* lying there.

Our coaling in both the *Hope* and the *Martha* was completed by the 11th, when we proceeded out of Porsanger Fiord, stopping at Honningvaag to telegraph to England.

We passed Nordkyn on the 12th, and met with an easterly gale, which forced us into lat. $73^{\circ} 20' N.$, long. $33^{\circ} 42' E.$, where we fell in with light streams of ice.

We arrived off the coast of Novaya Zemlya on the 17th, but were delayed by a dense fog, and had to dodge off the coast until the 19th, when we entered Little Karmakuli at noon.

I found that the officer who was to take charge of the observing station here had not yet arrived, but was expected hourly from Archangel. I therefore determined to wait a few days in hopes of meeting him; in the meantime I landed a depôt of provisions at the storehouse for the use of the *Eira*'s crew, and purchased some dogs and skin clothing from some Samoyedes encamped there.

The officers made a rough survey of the harbour and anchorages.

On the 25th, the Russian officer not having arrived, I determined to proceed northward, and left a letter requesting him to take charge of the stores, and to keep a good look-out for the *Eira*'s crew should they retreat upon Karmakuli.

I also made the same request to the chief of the Samoyedes.

We left the harbour with the tender in tow the same day, keeping as close to the land as possible in order to look out for boats, and at midnight we anchored at Altgläubigen Bay, Matotchkin Straits.

Having examined a cairn there and ascertained that the *Eira*'s crew had not passed southward, I left a record and large staff giving an account of our proceedings for the information of Mr. Leigh Smith, and at 3 p.m. on the 26th we weighed with the tender in tow to proceed to a bay eastward of Suchoi Noss, in order to place a depôt of provisions on that promontory.

We steered as close to the coast and islands as possible, in order not to miss any boats or retreating party, and having hauled into the south point of Mitucheff Island in order to obtain a clearer view of a cairn which was observed there, we suddenly struck on a reef lying off the west side of the island.

It was nearly high water at the time. We went on the shoal, under canvas and easy steam, going about six knots, and all our efforts to back her off on that tide were unavailing.

During the same night considerable swell was running over the reef, a strong northerly current forcing us on, and the ship soon began to strike heavily.

We were employed all night and the following day lightening the ship into the *Martha* and our own boats, but failed to get the ship off until high water of the evening tide of the 27th, when, by putting on full steam with all sails and heaving on our warps, we forced the ship off the rocks, and anchored for the night about a mile to the eastward in a dense fog.

We found that our rudder-post was knocked away from the keel, and was

hanging by some loose bolts at the head, but by means of levers and handspikes down the rudder-trunk we managed to steer the ship on the following morning as soon as the fog cleared off, back to our former anchorage at Altglaubigen Bay, and immediately commenced to trip the ship by putting all possible weights in the bows, and thereby lifting up the stern, in order to enable us to re-secure the rudder-post. The rise and fall of tide on this part of the coast scarcely exceeding two feet, rendered it useless to lay the ship on shore to complete our repairs.

Although we had every reason to believe that the main keel might be considerably damaged, the ship was making but little water, and could we only succeed in re-securing our rudder, there was nothing to prevent us proceeding on our voyage.

By working early and late we had by the evening of the 8rd of August succeeded in fixing a new rudder-post and hanging a rudder, but reduced in proportions.

We at once commenced putting the ship back to her sea-going trim, and otherwise preparing for the continuation of our voyage northwards to land depôts of provisions at Suchoi Noss and Admiralty Peninsula, and thence to Franz-Josef Land if possible.

A fortnight's provisions for the *Eira's* crew were prepared, and were ready to be landed in this bay.

At 10 A.M. we observed that the *Willem Barents*, which had just previously weighed, anchored again immediately off the west point of the bay, and had hoisted her colours.

Soon afterwards a boat arrived with Mr. Leigh Smith, who reported that his men were encamped in the bay round the point, having lost their ship, the *Eira*, at Franz-Josef Land in August 1881, and had retreated in their boats through the ice, and encamped here the previous evening; a dense fog having come on at the time prevented their coming into our bay.

I immediately ordered all hands away in our boats to bring the *Eira's* crew and their boats to the *Hope*, and by 3 P.M. we had the satisfaction of receiving the whole party safely on board, and they were berthed according to their rank and rating with our own ship's company.

The object of our voyage being now fulfilled, the *Hope* was in every way prepared for the homeward voyage, and after coaling from the tender, re-stowing our stores, and obtaining fresh water from the shore, our boats were hoisted up and the ship ready for sea by noon of the 5th, when we commenced to weigh anchor, but the fog coming on at the time compelled us to remain during that night.

We finally left Matotchkin Straits on the forenoon of the 6th. We found our rudder to answer well, and arrived off Nordkyn on the evening of the 9th, and we met with strong westerly winds and heavy sea.

South and south-westerly winds and high sea continued until the 14th, during which time we made as much progress as possible along the coast of Norway; the weather then becoming finer we arrived at Aberdeen.

I have the pleasure to mention to the Committee that I am much indebted to Sir Henry Gore Booth for his having finally come off to us when on the reef in order to offer any assistance in his power by receiving some of our stores, and also the commander of the Dutch exploring ship *Willem Barents*, who kindly lent us his carpenter and remained in the straits so long as the services of his carpenter were of assistance to us.

I have the honour to be, Sir, your obedient servant,

ALLEN YOUNG,

Commander of the *Eira* Relief Expedition,
Steamship *Hope*.

The Secretary of the *Eira* Relief Committee.

Dr. Jules Crevaux.—The untimely end of this adventurous traveller, who was killed last April, with all his party, by a band of Indians in the Grand Chaco, has excited much attention among our French colleagues, and in the Argentine States and Brazil. Dr. Crevaux had achieved a high reputation for the wonderful speed and success with which he had carried out several expeditions across the continent of South America, a brief account of which we have given from time to time in our Geographical Notes, and in the Reports of the proceedings of the Geographical Society of Paris. His object in his last undertaking was to cross from the La Plata to the head-waters of one of the little-known southern tributaries of the Amazons, and descend it to one of the points he had visited in his former journeys, but he was led to depart from his original plan and commence by the exploration of the Pilcomayo, the great tributary of the Paraguay, which is expected sooner or later to form a water highway between Bolivia and the La Plata. Had he lived to complete this undertaking, we might have looked for some account, from his pen, of the scientific results of his travels, regarding which very little has at present been published.

Italian Expeditions.—Two travellers, Signor Gustavo Bianchi and Professor Licata, are about to explore the interior of Abyssinia and the route thence to the new Italian settlement at Assab on the Red Sea. They will accompany, as far as the capital, the envoy who has been sent by the King of Italy with rich presents for King Johannes, and on the return of the envoy to the coast will start on their explorations. Signor Bianchi travels under the auspices of the Italian African Society (formerly il Club Africano di Napoli), and at the expense of Signor Rocca, the public-spirited Neapolitan banker. With regard to the new Italian possession just mentioned, a census just taken shows the total population to consist of 177 souls, of whom seven are Italians. A complete account of the place is given in two elaborate official publications issued by the Italian Government and noticed in our present number under the head of Africa in "New Books."—Count Pietro Antonelli is about to return to Africa and will visit Assab and Shoa.—Signor Pietro Sacconi has started on a journey to Harar with a view of founding a "commercial station" at that place, in the interests of Italian trade.—The latest news regarding the Italian Antarctic Expedition is very discouraging. It is to the effect that the vessel with Lieutenant Bove and the members of the expedition* on board had been wrecked; but happily without loss of life, the scientific staff and the crew having been saved by the English cutter *Allen Gardiner*. The enthusiastic and persevering commander has had throughout to contend with many difficulties. He had been engaged in the early part of the summer in scientific observations in the Straits of Magellan.

* Vide 'Proceedings,' vol. iii. p. 659.

Mr. Colquhoun's Expedition overland from Canton to the Irawadi.—A telegram reached the Secretary of State for India (sent from Mandalay through the Indian Government) on the 25th of July, announcing that Mr. Colquhoun had reached Bhamo. The message ran:—"I reached Shumao or Esmok end of April, where I was turned back; reached Bhamo (July 14th) by Western Yunan with difficulty, surveyed whole route Canton to Tali-fu." It thus appears that this persevering and adventurous explorer was unable to carry out his original plan of crossing the southern part of Yun-nan and the Shan States to Zimmay and Rangoon,* still he has succeeded in exploring a long line of route in Southern China previously untrodden by a European traveller. On this subject we refer our readers to the letter from Colonel Yule in the present number. An interesting letter describing some of the adventures of the expedition, written by Mr. Wahab the travelling companion of Mr. Colquhoun, in the Kwang-si province, appeared in the *Times* of the 17th of August. According to a later telegram Mr. Colquhoun has embarked in the mail steamer for England.

A Central Asian Railroad.—A report by M. von Schultz has been recently laid before the Imperial Russian Geographical Society on a survey, made by order of General Struve along the proposed south-eastward extension of the Orenburg Railway, and the result is to show that the best line is by way of the valley of the Ilek, across the southern part of the Mugodjar hills to Tetse-bash Bay on the north-western shores of Lake Aral. Another party at the same time starting from Kara-Turgai and Kazalensk, and working across the Kara-Kum desert to the north-west, examined the country east of the Great Barsuk sands; but this was found far less favourable than the Tetse-bash line, which is better populated, has more water, and a better supply of materials requisite for the construction of a railway; it is only 480 miles in length, terminating at Tetse-bash Bay, which makes a good harbour, while from the sea of Aral the rivers Oxus and Jaxartes are navigable for the distance of 1600 and 1300 miles respectively.

Biddulph's Routes near Gilgit.—Major J. Biddulph, who was on special duty in Gilgit a year or two ago, collected during his sojourn there a useful series of routes over the hill country surrounding Gilgit, many of them extending beyond Kashmir territory into almost unknown tracts. The routes are forty-six in number, some of them leading up to the crest of the great dividing range, where it forms the point of junction of the Hindu-Kush and Himalayan ranges, and crossing into the Oxus valley; one traverses the Darkot Pass, another leads to Hunza, which is described as a collection of villages with seven forts and a total population of about 5000 inhabitants, and thence two of the routes conduct to Panjah in Wakhan and Tashkurgan in Sirikol by the

* Vide 'Proceedings,' vol. iv. pp. 168 and 234.

Irshah and Kilik or Kirish passes respectively. There are several routes from Chitral into the Oxus basin, some by passes not previously described, open, however, only in summer. Much of this information is derived from Major Biddulph's personal experiences, the rest proceeds from natives, but both will doubtless prove useful to future travellers.

Lieutenant Hovgaard's Expedition.*—The *Dijnphna* left Tromsø on the 2nd of August *en route* for Vardø, whence Lieutenant Hovgaard intended to proceed to Yugor Strait to fill up with coal.

International Polar Meteorological Expeditions.—The *Varna* left Tromsø with the Dutch expedition† about the 25th July, and was expected to return in September from Dickson's Havn. The Norwegian station at Bosekop, on the Alten Fiord, commenced operations on the 1st of August, in accordance with the International Polar Commission. Great magnetic perturbations were observed during the night. Captain Palander telegraphs that the gunboats *Urd* and *Verdande*‡ have returned to Tromsø after landing the Swedish expedition§ at Cape Thordsen in Ice Fiord, the locality previously decided upon in the event of their being unable to reach Mossel Bay. Off the Norway islands the gunboats encountered heavy ice, which had lain there since last winter, and which extended eastward as far as they could see. Captain Palander reports that the state of the ice was unusually bad; that the landing was accomplished with great difficulty; and that the observations would commence on the 15th of August. He intended to remain four days at Tromsø to take in coal, and then return to Copenhagen. As the *Pola*|| has not been reported since she left Tromsø, it is reasonable to suppose that her second attempt to reach Jan Mayen has been successful.

The Musgrave Ranges, Central Australia.—In a recent report to the Commissioner of Crown Lands at Adelaide on the route to the Musgrave Ranges (E. long. 131° 30', S. lat. 26° 30'), Mr. James W. Jones, Deputy Surveyor-General, affords some interesting information regarding a little-known tract of country, which has been taken up by pastoral lessees. Mr. Jones calls especial attention to the abnormal dryness of the past season, quoting statistics on the subject from the records kept at the stations on the Overland Telegraph Line, and kindly supplied to him by Mr. C. Todd, C.M.G. Mr. Jones himself saw little grass of recent growth; on the flats between the rocky spurs and outlines of the granite ranges there was fairly good but dry tufty grass from 12 to 18 inches high. In many places it had been burnt some months previously by the natives; and no running waters were seen. The sandy bed of Tietkens' Birthday Creek was quite dry, even at the spot where water

* See *ante*, p. 499. † *Ibid.*, pp. 499 and 293. ‡ *Ibid.*, p. 499.

§ *Ibid.*, p. 293.

|| *Ibid.*, p. 499.

was found by the late Deputy Surveyor-General (Mr. W. C. Gosse), and also by Mr. Ernest Giles. In a small tributary at the source of this creek in a steep gorge of the granitic rocks, Mr. Jones found a chain of several good rock holes; the lowest only is accessible to cattle. In this hole there was more than sufficient to water his eight camels, there being some two or three hundred gallons of water in each hole. At the source of the Ferdinand Creek, in the tributaries examined off Glen Ferdinand, there was a little water in rock cavities in the bed, particularly where the detritus and decomposed vegetation has formed a shallow, black sandy, and clayey soil, and where rushes and flags are growing. This water, Mr. Jones thinks, is the drainage or soakage from rocky gorges of higher level; the broad sandy bed of the main channel of the Ferdinand was quite dry. He cleaned out several native wells in different parts of the creek as he traced it downwards, with the same disappointing result. At the head of the Read Creek near the base of Mount Woodroffe (the highest point of this part of the range—altitude, 4000 feet above sea-level) there were also two or three hundred gallons of water in rocky basins, easily accessible with the camels. There were evident signs here of a good drainage of water in favourable seasons, but like the other waters this appeared to him to be a soakage from upper levels. In the black soil at the bottom of the rocky gorge rushes and high flags were growing; most of the flags were, however, dead, evidently in consequence of the present dry season. There can be no more striking proof of the dryness of the season than the state of the large natural water-holes in the Peake, Aimee, and other clay-bottomed creeks, some of which are nearly half a mile long, 50 feet wide, and 10 feet deep. Without exception Mr. Jones found them all dry, and in the bed of some the remains of fish from 3 to 8 inches in length, and also very large mussel shells. Throughout most of the country examined the evidence of large periodic floods down the numerous watercourses was very striking, the last flood having probably taken place almost four years ago. It is undoubtedly impossible to take any stock to the ranges until after a very considerable general rainfall. By the best route there is now one stage of above 150 miles entirely waterless. Mr. Jones, therefore, strongly advises the lessees to defer sending any stock until the country has been first visited, and thoroughly examined by their station manager, and the resources carefully tested.—The Musgrave Range natives are numerous, but generally scattered into small hunting parties. In appearance they are rather superior to most of the Northern natives. Some of them had, no doubt, seen previous exploring parties, but the extent of their English was the one word "white fellow." In the short time at Mr. Jones' disposal it was difficult to reliably ascertain many words of their own tribal language. The only words he recognised as being common to other tribes were "kuppy" (water) and "punta" (rock), very frequently used to describe rock-water. These

words are common to all the tribes in the south-west part of the province, from Fowler's Bay and Eucla inland. Mr. Jones also noted the following useful words:—"Karoo" (creek), "appinger" (salt), "uroo" (large), "weeah" (no). Notwithstanding that he found these natives friendly, yet they are very suspicious, and it would not be wise to trust too much to them.

Report on Admiralty Surveys for the Year 1881. By the Hydrographer,
Captain Sir FREDERICK J. O. EVANS, R.N., K.C.B., F.R.S.*

The following ships of war have been employed during the year 1881 on surveying duties on foreign stations:—

	Horse Power (Indicated).	Tonnage (Weight in Tons).	Officers and Men.
STEAM VESSELS:			
<i>Alert</i> —East Coast of Australia, Torres Strait, Arafura Sea.	310	1240	120
<i>Fawn</i> —Red Sea; Shoal banks in Indian Ocean, Delagoa Bay.	480	1050	123
<i>Flying Fish</i> —North-east coast of Borneo, Tsugar Strait in Japan, also West Coast of Yezo and East Coast of Nipon.	840	940	113
<i>Maggie</i> —Hainan Island; Shoal banks in China Sea	860	805	114
SAILING VESSELS:			
<i>Alacrity</i> —Fiji Islands	Schooner	120	34
<i>Sparrowhawk</i> —West Indies	Ditto	86	24
<i>Lark</i> —Built for surveying service in Western Pacific Ocean; left England in June, arriving at Sydney in October.	Ditto	180	(including 20 hired men.) 35

In addition to the foregoing, the hired steam vessel *Gulnare* has been employed on the coasts of Newfoundland, and the sailing schooner *Meda* on the shores of Western Australia. The expenses of the *Meda* are borne jointly by the Home and Colonial Governments.

Two vessels have been engaged on surveying duties on the coast of the United Kingdom; the paddle-wheel steam vessel *Porcupine* belonging to the Royal Navy, with a hired crew; and the small paddle-wheel steam vessel *Knight Errant*, hired especially for this service.

The number of officers of all ranks employed in the several vessels herein referred to, amounts to 79, and their crews to 555.

Coasts of the United Kingdom.—Staff-Captain Parsons and his surveying party in the *Porcupine* were engaged in the early part of the season on the East Coast; closely re-sounding the Scroby and Corton sands fronting Yarmouth; these extensive shoals, with their several navigable channels, being subject to change, especially after winter gales.

In continuation of the work executed in 1879 and 1880, the months of July and

* From the Parliamentary Report, June 8, 1882.

August were occupied in extending the sectional lines of soundings in the English Channel and its approaches; the western of these lines reached a position 85 miles seaward of Ushant, and included a bank several miles in extent shoaler by some 21 fathoms than the neighbouring waters, which average 77 fathoms. As this comparatively shoal ground had not hitherto appeared on the charts it has received the name of Parsons Bank.

To complete the more recent surveys of Spithead and its approaches, the Horse, Dean, and Motherbank shoals have been re-sounded; their last examination having been made in 1848.

At Harwich Harbour a re-survey was made of the entrance, at the request of the Board of Trade, in order to determine the movement of the shoals in the neighbourhood of Landguard Point, as resulting from modern engineering works.

Staff-Commander Tizard and his surveying party in the *Knight Errant* have been chiefly employed in the Irish Channel and on the east and south coasts of Ireland.

Ramsay Harbour and Port Erin, Isle of Man; Dundalk Bay and Harbour; the bar and approaches to Wexford Harbour; Waterford Harbour and bar; with the Queen's Channel, have severally been re-sounded, to meet either changes by time, or local improvements.

Sectional lines of soundings, south of Ireland, in continuation of those made in 1879 (see report for that year) reaching to the parallel of Ushant, and extending westward to the meridian of 9° W., were made in the midsummer months with the same special attention to accuracy of detail.

Passing into the Bristol Channel, the Scarweather and North shoals were closely re-sounded, and marked changes in the configuration of their seaward ends detected, necessitating a readjustment of their buoyage.

Staff-Commander Jarrad was detached in the summer to make a detailed survey of the whole tidal area of Wexford Harbour; this was completed from the entrance as far up the Slaney river as the drawbridge above the town.

An examination was also made of a part of Wexford South Bay in order to define the position of the shoal ground known as "Holden's" bed, which had shifted considerably from its earlier charted position.

This officer further completed a large scale plan of Wicklow Harbour, showing the harbour works in course of construction; and a re-survey of Wicklow roadstead.

West Coast of Africa.—Consequent on the request, combined with the offer of assistance, of the British and African Steam Navigation Company, for a more complete survey of the bars and mouths of the oil rivers in the Bights of Benin and Biafra, Lieutenant Field was despatched on this service in October. With the co-operation of Her Majesty's cruisers *Foam* and *Pioneer* in the neighbourhood, and the small light-draft branch steamers placed at his disposal from time to time, this officer, by unremitting zeal, succeeded in charting in full detail the Nun entrance of the great Niger river, locally known as Akassa, also the mouths of the rivers New Calabar, Opobo, and the Portuguese and Man of War channels of the Bonny. The sounding work was completed by the close of the year, and before the well-known "smokes" of this region had set in.

Lieutenant Field, in his reports, acknowledges the hearty co-operation he received from Sub-Lieutenants Fawckner and Coxon of the *Foam*, and from Captain J. Gillies, the agent of the company preferring the request for the surveys.

West Indies.—Lieutenant White, with his small party in the sailing schooner *Sparrowhawk*, having completed a detailed survey of the Grand Cayman Island, as also an examination of the western part of the extensive Pedro bank, south of Jamaica, proceeded in the fall of the year to Nassau, New Providence, and

thence to complete the survey of the Little Bahama bank, originally commenced in Her Majesty's ships *Thunder* and *Lark* so far back as 1836-46.

Fair progress has been made on the part situated between the Elbow Cay Lighthouse and Pensacola Cay.

Newfoundland.—The survey of the deeply indented shores of Newfoundland has made steady progress during the year under Staff-Commander Maxwell in the hired steam vessel *Gulnare*. Following up the work of former years, the outer coast of Notre Dame Bay, terminating eastward at Toulinguet Island, has been completed; Hall Bay to the westward has also been completed in full detail.

On the western coast, the survey of the spacious Bay of Islands with its deep arms, in continuation of the survey of last year, has been completed in full detail.

China.—Lieutenant and Commander Carpenter and staff, leaving England in January, relieved Captain Napier and party in the *Maggie*, and the vessel having been thoroughly refitted at Hong Kong, work was commenced in South China in May.

Captain Napier's excellent survey of the eastern entrance to Hainan Strait, referred to in the Report for 1880, was continued to the westward and completed with the same attention to detail. This somewhat important, and certainly useful highway, is now in course of being completely charted.

In continuation from Hainan Strait, the west coast of Hainan, which was found to be several miles out in position, was connected by running survey with the south coast of the island, as charted by the well-known Daniel Ross of the Indian Marine in 1802, and this charted part again connected by running survey with the eastern entrance to Hainan Strait.

Lieutenant Carpenter considers that the entire coasts of Hainan are now in relative position, and that its salient points are well delineated. He describes the island as volcanic in character, many of the mountain peaks retaining their crater form; some of them attain heights exceeding 5000 feet; they are steep and apparently inaccessible. The plains are cultivated with sugar and maize.

Included in the useful work performed during the year in the *Maggie* was a fairly full examination of the Macclesfield bank, its boundaries for the first time being determined. The features of this extensive bank of soundings, 75 miles in length by 37 miles in breadth, are remarkable; the whole may be described as a submerged atoll reef; on this reef or rim of the bank the average depths are about 10 or 11 fathoms, with almost perpendicular sides seaward; these sides fall from 20 to 600 fathoms in some parts, and then descend to 1300 fathoms, the average depth of the floor of the surrounding ocean; within the rim the depths range from 30 to 55 fathoms. The examination carried out in the *Maggie* failed in finding depths under 9 fathoms, although 4½ fathoms on the northern edge is recorded on good authority.

Borneo—Japan.—Early in January the *Flying Fish*, under Lieutenant and Commander Hoskyn, commenced an examination of the north-east coast of Borneo, which extended to the middle of April. Lieutenant Hoskyn confined his survey principally to the channel used by the trading steamers when running along the coast between Mallawalle Island (near the north extreme of Borneo) and Sandakan Harbour. In charting this route, especially during the thick and hazy weather which accompanies the north-east monsoon, much close examination was required to find passages worthy of the name of channels through the labyrinth of reefs that extend nearly the whole distance.

Lieutenant Hoskyn remarks that the trade on the coast has lately much

increased, and probably will continue to do so as the country becomes opened up, but that, owing to the difficulties of the coast navigation, the whole seaboard being fringed with coral reefs, the traffic must be carried on, as at present, either in native boats or small steam vessels. The rivers from which the principal produce at present comes appear to be the Kinabatangan, the Luikabo in Lubuk Bay, and the large rivers which empty themselves into the upper part of Sandakan Harbour.

Much difficulty was experienced in obtaining the correct names of places. The inaccuracy of many of those published on the coast of Borneo has been frequently noticed; this arises in part from certain places being known under different names to the various tribes who frequent the coast. As regards the north-east coast, it has been so swept in past years by the Sulu pirates that now they are the only people who have any real knowledge of the coast. Through the friendly offices of Mr. Pryen, the agent of the North Borneo Company at Sandakan, Lieutenant Hoskyn obtained the services of an old Sulu pirate and also of a Sandakan native; the names that will appear on the coast survey are dependent mainly on their information.

Proceeding to Japan, after refit at Hong Kong, Lieutenant Hoskyn embraced the opportunity, when in the vicinity of Omai-saki at the entrance to Suruga Gulf, to search for the Oleander rock (a danger on which the British barque of that name, drawing 14 feet, was reported to have struck in August 1880), but without success. The fishermen in the neighbourhood assert that no such danger exists.

During the summer months the *Flying Fish* was engaged in Tsugar Strait, that part of the strait eastward of a line joining Hakodadi and Toriwi-saki has been completed in detail, and the dangers off Siriya-saki and Toriwi-saki, over which so much doubt has existed, are now properly charted.

Of the reported dangers, Charybdis rock could not be found; the lighthouse-keeper and fishermen state that the Rattler rock is the outermost danger off Siriya-saki.

The western coast of Yezo from Cape Rodgers to Cape Ota has been surveyed in connection with the western entrance of Tsugar Strait, embracing the off-lying islands of Okosiri, O-sima, and Ko-sima. This work was carried out with difficulty, owing to fine weather being rare, the wind blowing alternately with strength from south-east and south-west, with intervals of calm foggy weather.

During the occasional visits of the ship to Hakodadi, the harbour was resounded.

The *Flying Fish* left Hakodadi in the middle of October, her commander intending to employ the remainder of the year, 1881, in Van Diemen Strait.

East Coast of Australia—Torres Strait—Arafura Sea.—The *Alert*, under Captain Maclear, after being docked and undergoing a complete refit at Sydney, occupying three months, left that port in the middle of April, the first service being the measurement of meridian distances, in continuation of the work of former surveyors, to Port Curtis, the Percy Islands, and Port Molle. Detailed surveys were made of the last-named port, as also of the passage between Molle islands and the mainland, this passage being frequented by the local steam vessels passing to and from Port Denison.

Proceeding along the inner route to Torres Strait, and contributing on the voyage to the hydrography of this remarkable ocean highway, Thursday Island, in Torres Strait, was reached early in June. Making the small settlement on this island a central station, an exhaustive survey was carried out of Prince of Wales Channel, and of its eastern and western approaches, extending from Double Island on the east, to

the meridian of $141^{\circ} 52'$ east longitude on the west, including an examination of the boundaries of the Larpet and Gerard banks, and the sounding out the neighbourhood of Booby Island.

In this exhaustive survey, which will be of great benefit to the rapidly increasing navigation through Torres Strait, as being the direct route, various reported dangers have been cleared from the charts, one or two discovered, and the positions of others accurately determined.

The small settlement at Thursday Island, where there is a resident magistrate, is useful as a coal depôt, and much business is transacted in supplying stores to the small fleet engaged in the pearl fisheries in Torres Strait, and in forwarding their produce; there is an average call of a steam vessel once a week. At the time of the visit of the *Alert*, the fishery then engaged at Warrior Reef gave employment to 130 vessels and about 1000 men. The imports in 1880 were valued at 15,218*l.*, and the exports at 52,275*l.*, of which 47,664*l.* was for pearl shell, and 2808*l.* for bêche de mer.

Before quitting this neighbourhood the *Alert* was fortunately enabled to render assistance to the Italian transport ship of war *Europa*, which had accidentally grounded near the Thursday Island settlement.

On leaving Torres Strait for Port Darwin, in the early part of October, several lines of soundings, transverse to the track taken by shipping, were made; until Cape Wessel on the western side of the Gulf of Carpentaria was reached. The longitude of this salient point was verified by sea observations, as being correctly charted.

After rating chronometers at Port Darwin, the *Alert* in November proceeded to Singapore, before the westerly monsoon had set in with strength: passing Timor and Wetta islands, and thence by way of Sapodie, Banca, and Rhio Strait, amendments to the charts being effected on the voyage.

Western Australia.—Staff-Commander Archdeacon, in the *Meda*, surveying schooner, has been engaged on the north-west coast in making elaborate plans of Beagle Bay and Port Walcott (Tien-Tsin), continuing the survey from the latter place towards Legendre Island. The continued ill-health of the *Meda's* crew obliged the vessel to proceed to the southward for change of climate at an earlier date than was contemplated.

Proceeding inshore, the geographical positions of Cape Preston, North-West Cape, and the entrance of the Gascoyne river were amended, and a sketch survey of the mouth of the Gascoyne and the anchorage off it, executed.

Western Pacific Ocean.—Lieutenant G. E. Richards, in succession to Lieutenant Moore, continued in the *Alacrity* the survey of the Fiji Group.

This officer informs me that he has completed the south and south-west coasts of Vanua Levu from meridian of 179° east to $178^{\circ} 15'$ east; including Yadua Island, and the north-east coast of Viti Levu from $178^{\circ} 15'$ to $178^{\circ} 35'$ east, together with the intermediate islets and reefs.

Red Sea—Indian Ocean—East Coast of Africa.—Captain Wharton, in the *Faun*, having completed the survey of the Sea of Marmara, as mentioned in the report of last year, the ship was refitted at Malta, and recommissioned by Commander Aldrich. The first work for 1881 was undertaken in the Red Sea, during the cooler months of the year, and was continued from February to the early part of June.

During this time a detailed survey of the Hanish Islands was commenced, and although the work was occasionally retarded by the strong southerly winds prevalent in the lower part of the Red Sea at this time of the year, the eastern side of the group was nearly completed.

Leaving Aden towards the end of June, the *Fawn* commenced in July sounding over the Saya de Malha bank, and favoured by three weeks of fair weather, was enabled to chart a large part of the main features. It has long been considered a reproach to hydrography that so little was known of this extensive area of shoal water; well-authenticated accounts existed of 6½ and 7 fathoms having been found on the bank; also reports of as little as 4 fathoms. Commander R. Moresby, of the Indian Navy, commenced its examination in 1837-8, but his surveys, preserved in the Admiralty, do not indicate less than 9 fathoms.

Furnished with Moresby's soundings, Commander Aldrich was enabled to take up new ground, and succeeded in defining the boundaries of the bank to the depth of 100 fathoms, as also to chart much shoal water; the smallest depth obtained in the *Fawn* being 5 fathoms.

The Saya de Malha bank, the limits of which are comprised between the parallels of 8° 15' south and 11° 45' south, and between the meridians of 59° 35' east and 62° 20' east, is formed of two main banks; the north bank, about 80 miles long and greatest breadth 25 miles, has a shoal ridge that extends nearly the whole length, chiefly on its eastern side, the least depth found (5 fathoms) is in latitude 9° 13' south: the south bank assumes a somewhat circular shape; its area is much greater than the north bank with shoal ground on its northern and eastern sides, on which the least depth found in the *Fawn* was 11 fathoms, and by Moresby 8 fathoms.

After refit and recruit of the crew at Mauritius, the *Fawn* proceeded to Delagoa Bay, and executed some useful work in sounding between the Shefeen Beacon and Elephant Island, defining the edges of the Shefeen and Lech reefs.

From Delagoa Bay the ship in October proceeded to resume her surveying operations in the Red Sea, calling at Inhambane, Mozambique, and Zanzibar on the passage.

As notified in my report of last year, much useful addition to hydrography is received from time to time, from nearly all the maritime states of the world; many of which have government departments dealing specially with hydrography, similar to the Hydrographic Department of the Admiralty. Between these departments and our own (and the same holds good as regards India and the Colonies) there exists a free interchange of charts and other documents bearing on coast navigation and harbour pilotage.

In the remark books kept in Her Majesty's ships, and from the periodical returns furnished by the navigating officers of Her Majesty's ships, valuable hydrographic information, bearing either on the revision of, or as additions to Admiralty charts and sailing directions, are now almost daily received at the Admiralty.

Of these reports may be mentioned one of a visit to Diego Garcia, in the Chagos Archipelago, made in Her Majesty's ship *Eclipse*, Captain Garforth, in the interests of steam navigation between this country and Australia; also in relation to the Eastern Archipelago much useful information has been contributed by the officers of Her Majesty's ship *Egeria*, particularly on the north-east coast of Borneo; and arising from a recent visit to the north-west coast of Africa, in Her Majesty's ship *Espiegle*, an interesting report has been received from Captain Bridge of that ship, on Cape Juby (at present a trading station of the North-West African Company), as also of the remarkable estuary of the Ouro river, some 300 miles further to the southward.

Captain Bridge bears testimony to the fidelity of the charts of these regions, executed by Admiralty surveyors sixty years ago.

Among contributions from the mercantile marine, may be noticed some useful remarks made during a voyage to the Sea of Okhotsk and the shores of Kamchatka, by Mr. A. Ponsonby, commanding the steamship *Cleveland*; as also several useful lines of soundings, obtained in the neighbourhood of Tampico, and of Vera Cruz, in the Gulf of Mexico, by the steamships *Dacia* and *International*, belonging to the Indiarubber, Gutta-percha, and Telegraph Works Company.

Summary of the publications of the Hydrographic Department during the year 1881 :—

Charts.—58 new plates of charts and plans have been engraved and published, and 31 plates improved by the addition of new plans.

2500 plates (the same number as in the year 1880) have received corrections by the engraver.

Nearly 20,000 charts have received minor corrections at the hands of the draughtsmen.

The number of charts printed for the requirements of the Royal Navy, for Government Departments, and to meet the demands of the general public, has during 1881 amounted to 214,880.

Hydrographic Notices and Notices to Mariners.—48 of the former (containing 346 pages octavo), and 262 of the latter, have been published; copies of each of these, to the number of 750 and 1500 respectively, have been distributed at our home ports, in the colonies, and among consuls, and foreign maritime authorities.

Books.—The following volumes of Sailing Directions and other Hydrographical works have been published in 1881 :—

1. West Coast of France, Spain, and Portugal: 3rd edition, containing sailing directions from Ushant to Gibraltar Strait, including also the African coast from Cape Spartel to Mogador.

2. Mediterranean Pilot, Vol. IV.: comprising the Archipelago, with the adjacent coasts of Greece and Turkey; including also the island of Candia or Crete.

3. St. Lawrence Pilot, Vol. II., 5th edition: containing sailing directions for the southern parts of the Gulf of St. Lawrence, and for its south entrance through Chedabucto Bay and the Gut of Canso.

4. Australia Directory, Vol. III., 2nd edition: describing the north, north-west, and west coasts of Australia; extending from the Gulf of Carpentaria to Cape Leeuwin.

5. Gulf of Aden Pilot, 2nd edition: containing sailing directions for the Gulf of Aden, Sokotra, the Somali coast from Cape Gardafui to the entrance of the Red Sea, and the Arabian coast thence to Ras-al-Hadd.

6. List of time signals, established in various parts of the world.

7. A new method of clearing the Lunar Distance, by Sir G. B. Airy, K.C.B., F.R.S., late Astronomer Royal.

8. Admiralty catalogue of Charts, Plans, and Sailing Directions (amounting to 2696 engraved plates; as also of 82 books and pamphlets of sailing directions), with the scale, official number, and the price of each chart and book attached, for the year 1881.

9. Tide tables for the British and Irish ports, for the year 1882; also the times and heights of high water at full and change for the principal places (3200 in number) over the globe.

10. Admiralty lists of Lights, throughout the world, comprised in ten pamphlets, 1881.

The following Sailing Directions are preparing for publication :—

Channel Pilot, Part II.	4th edition.
North Sea Pilot, Part III.	4th edition.
St. Lawrence Pilot, Vol. I.	5th edition.
China Sea Directory, Vol. IV.	2nd edition.
Persian Gulf Pilot	2nd edition.
Principal ports of the East Coast of the United States of America.	3rd edition.
Pamphlet A, of S.W. Pacific Ocean	New work.
Vancouver Island Pilot (Supplement)	New work.

CORRESPONDENCE.

Mr. Colquhoun's Journey from Canton to Bhamò.

Aug. 15th, 1882.

In reply to your letter of to-day about Mr. Colquhoun's journey, let me say that I have seen the telegram from Calcutta in the *Times* of yesterday, but it is very difficult to make head or tail of it. Probably the writer did not have any very clear apprehension of the matter, and the telegraph has perhaps added some further confusions.

Mr. Colquhoun is said to divide his journey into two parts—the first the "Canton river," and the second the "Yunnan river." There is no river known to geographers by the latter name; but I can only suppose it to mean that from the bifurcation of the Si-kiang, or "West river," i.e. the Canton river, up which Mr. Colquhoun travelled from Canton—(the bifurcation that takes place near Hsin-chou in about long. 110°)—he calls the river below the said bifurcation "the Canton river," and the branch which he ascended "the Yunnan river."

It is the more northerly branch (called Hong-kiang, &c.) which, according to our maps, rises in Yunnan, and not far east of Yunnan-fu. But it is the southerly branch, passing Nanning-fu, which was, before recent disturbances, the route of an important trade from Yunnan to Canton, and therefore it seems most probable that Mr. Colquhoun followed the latter. A passage regarding this route, based on one in Richthofen's Letters, will be found in a paper of mine in the *Geographical Magazine* of April 1875, p. 99.* This branch's sources seem hardly to pass the boundary of Yunnan; they are almost confined to Kwang-si province.

I imagine that Colquhoun, on arriving in Yunnan, endeavoured, as his intention in a general way was when he left England, to make his way down through the Shan States into Pegu; and that he got as far as the *Semao*, or Szemao of the maps, south of Puer or Pou'eul, and not far from Kiang Hung (or Xieng Hong) on the Mekong,

* "Formerly there existed a very important trade-line from Yunnan to Canton, which involved little more than twenty days of land travelling; taking up the navigation of the southern or Nanning-fu branch of the Si-kiang or West River of Canton. The navigation commences at *Pé-sé-p'u*, a place that I cannot indicate on the map, but which appears from Biot to be in the Saengen-fu department of Kwangsi. The voyage thence to Canton is of twenty days, down stream. The road of late years, owing to the disorders in Kwangsi, has been entirely abandoned; but "the metals of Yunnan, the jade and gems of Burma, the musk of Tatsienlu, and many other articles of that remarkable through-trade which passed through Yunnan from west to east, went formerly by that route."

where he was stopped "by the intrigues of the officials." This place, once familiar as "Esmok" in the days of Captain Spry, I presume, you see, to be the "Shumao" of the telegram.

It is said "an examination of the country between Yung-hoo and Shumao was considered most important," but this is what "no fellow can understand." The most probable interpretation occurring to me is that "Yung-hoo" means *Toungoo* in British Burmah, and that what the traveller considered desirable was to make his way from Szemao, where he was stopped, to *Toungoo*.

But, on being stopped, he would appear to have turned due north and made his way from Szemao to Tali-fu, perhaps through Shunning-fu. This would bring him into the latter part of the most direct road from Mandalay to Tali.

The remainder of his road, from Tali to Bhamò, has, as you know, been often travelled of late years. But so far as I know (and always excepting the travels of the Roman Catholic missionaries, which are little known in most cases), Mr. Colquhoun's journey up the upper waters of the Canton river to Yunnan, and again his journey from Szemao to the neighbourhood of Tali, are over ground of which we have no European report whatever, and they should afford much of interest.

Mr. Colquhoun is to be congratulated on an enterprising and successful geographical achievement, of which we can say no more till we have a fuller account of it.

As to the value of the journey in opening up a new commercial route, that is a matter on which it is not my nature to take a sanguine view. His route between Canton and Yunnan can hardly come near that from Yunnan by the Tongking river to Hanoi in physical advantages. And from what is said in the telegram, as well as by Richthofen in the passage to which I have referred above, the political impediments seem to be even greater on Colquhoun's route.

Yours very truly,

The Assistant Secretary R. G. S.

H. YULE.

The Irawadi and the Sanpo.

HENYADA, BRITISH BURMA, July 7th, 1882.

By last mail I received my copy of the May number of the R.G.S. 'Proceedings,' and see that the subject of the Sanpo outlet to the sea has again engaged the attention of the Society. I am not at present disposed to reply to any reference to myself, or to my report on the Irawadi, which you were kind enough to notice in the *Nineteenth Century*; but I should like an addendum to be made in the 'Proceedings' to Major Sandeman's paper. It is an official Note which I caused to be added to the original when this was still confidential. I saw Major Sandeman's native surveyor (Moung Alaga) by appointment in the Survey Office at Rangoon, and in Major Sandeman's presence carefully examined him. The substance of the examination is contained in the Note, a copy of which I gave to Major Sandeman at the time.

I am still working steadily at the problem, and am in correspondence with others in China and India (and I hope soon in Tibet) who are also working at it. You have read the geographical part of my Report and may possibly agree with me that all who took part in the discussion at the Royal Geographical Society's meeting in February missed the principal points of my arguments, or at least did not allude to them. I confess that I always looked on the size of the Irawadi as described by Mr. Strettell where it issued from the hills as the weakest part of the whole case, and the one where attack must be most expected, and it was at my suggestion that the Chief Commissioner wrote to General Walker, and offered to

pay the cost of any exploration on the Upper Irawadi. I also wished to have the upper river accurately measured both at low water and flood, but this, for political reasons, was impracticable. I am now trying to get this done by the Irawadi Flotilla Company's agents. But Major Sandeman most satisfactorily carried out the examination of the Irawadi up to near the junction in lat. 26° , and so far from weakening the argument or evidence I had set up he has completely removed the weakness I was conscious of. He has proved the river to be almost as large at the highest part of the main channel visited—Shanatayoke-ywa—as at Mandalay. At Waingmaw it is a mile broad with a rise of 25 feet from low to high water. I carefully tested the surveyor's power of judging distances. Both Major Sandeman and myself have had considerable practice in this, and from his office we made the surveyor state how far he thought objects to be, and we found that we all agreed almost exactly, so that in the absence of direct measurements his statement may be taken as a just approximation. Now leaving out the low-water section of the river at Waingmaw, and supposing it to be 5000 feet wide by 25 feet deep, we have a cross-section of no less than 125,000 square feet. The flood comes down with great velocity there, probably 8 feet per second on the average, certainly not less, and we thus have in round numbers the 1,000,000 cubic feet per second at which I estimate the flood discharge at that part.

But according to Major Sandeman's map, which I presume I must look upon as the orthodox view, the Irawadi has only about 8000 or 10,000 square miles at most of basin above the junction. We have the measured rainfall of Munipoor recorded by Pemberton, and Munipoor lies on the monsoon path towards this region. The rainfall is only 48.33 inches. We have the upper Kym-dwin basin which lies also in the same path, and which must receive a larger rainfall than this Irawadi basin, and which certainly has no extraordinary supply. And we have the sizes of the channels of the Mogong, Taping, and Shweyli rivers, which give us a very fair means of knowing the rates of discharge; yet none of these are extraordinary.

I had anticipated Colonel Yule's objection by showing that each of the Brahma-putra tributaries has a sufficient gathering ground already. Captain Michell, of the Intelligence branch of the Indian army, has been putting together some notes which he intends to lay before the Society, and of which he has sent me a copy. He has learned that the Sanpo as well as the Irawadi are called by the same name—Sri-Lohit—by the hill people of Assam. I trust you will be able to publish Captain Michell's notes, and also a translation of Kreitner's remarks on the native testimony as to the Sanpo from last June's number of Petermann's 'Mittheilungen.'

Note to the Irawadi Exploration Report.

June 8th, 1880.

"Mr. R. Gordon, who is engaged on the construction of the embankments of the Irawadi, and who naturally takes an interest in the exploration of the river, had an interview with Mounng Alaga, and has gained the following additional information from him.

"On November 8th Mounng Alaga arrived at the lower end of the Singoung defile, staying at Thapanbin village. He was for three days in the defile, arriving at Sinbo at the upper end on the 11th November. Although the entire length was only a little over 20 miles, the rapidity of the current was such that he could not proceed faster. The narrowest places of the defile were between 300 and 400 paces (each pace averaging 30 inches). The water-level was the full breadth where he passed. The flood rise was between 30 and 40 feet above the then level of the surface.

"At and above Sinbo the river was wider than elsewhere in the upper course. It

was at least a mile and a half in breadth. Portions of the channel were filled with sandbanks, which were then appearing above the falling water. The rise above the November level of the water to flood was about 18 or 20 feet near Sinbo, the river having a steep bank on the west side.

"On the 12th November he left Sinbo, arriving at the mouth of the Mogoung river on the 14th November. The Irawadi was somewhat in excess of a mile in breadth; the east bank was steep; the rise from the November level to flood was 18 or 19 feet. There were sandbanks opposite the Mogoung river on the west bank, partially filling the channel, which was however nearly the full breadth of the river. He found the channel full of pools and bars: the former had depths of 50 to 60 feet. The channel was 18 feet in depth, the water flowing with a moderate velocity. He saw the Mogoung river mouth. It looked very narrow, about from 100 to 200 feet in width. He had men in his boat who knew this river, and who said it was wider higher up; but he obtained no precise information about it.

"On going north he found the river get narrow about Natseldoung, where he arrived on the 22nd. Here hills on the right bank close in on the river; but all the way up the left bank is free from hills and rolling ground. At this place the rocks are found in the channel half-way across the river. The width of the river is still about 1500 paces in flood, and it is only when the water falls that the channel narrows.

"He arrived at Kacho on the 23rd. This place has about 80 houses. It is the largest village on the river in this part. He stayed here for one and a half months, leaving it again on January 15th. Opposite Kacho there is a large island called Zeegyoon, with a village upon it. The river below Zeegyoon was 1700 paces broad, with a rise to flood of about 15 feet. The water fell about 5 feet in December, the extreme fall reaching to about 18 feet below the top of the bank. The flood rises even with the higher part of the bank. Last year it rose to this height on a few occasions. Cultivation extends on the east bank.

"Waingmaw is a mile and a half above Kacho. Here the bank is steep and high. It stands nearly 40 feet above the surface of low water. The flood rises only about 25 feet above this. The river is about one mile broad at Waingmaw. There are banks of gravel in the river, occupying part of the channel. They are all of gravel, no sand being found here. At the very lowest the water had still a moderate velocity, with a depth of about 10 or 11 feet at the deepest part. It was generally shallow here. Boats cannot row up the river; they are propelled by poling.

"In January there was a slight rise in the river at Kacho of about 1½ feet before he left. This came from the western branch, as he afterwards found out from observation. He was told it came from the melting of the snows. On the 15th January he left Kacho to journey by road, reaching Maingna and Shantayoke-ywa, or Chinese-Shan village, on the 16th. This marks the northern boundary of the Burmese kingdom. The river channel here gets full of rocks; the water flows with great velocity among these, but it is possible for boats to go upwards, although the rapids cause great shallows. Below Shantayoke-ywa the river has a width of over half a mile, but above it it broadens to over a mile. In floods boats cannot go above this part; but in November it becomes practicable, and they can ascend to the junction of the two branches.

"Moung Alaga went by road towards the junction, but followed a path about a mile and a half from the river. He arrived at Pouksantoung, a hill opposite the junction, but four miles distant from it, on the 18th January. This hill was the highest in the neighbourhood, and commanded a magnificent view all round. He could see the Irawadi for far in a straight line. There were few or no curves in

it. The hills came down close on the right bank. To the east the country was flat and covered with forest jungle. As the river course neared the mountain, it narrowed down from the width at Shantayoke-ywa, and, as far as he could judge from a point four or five miles off, it did not exceed 600 paces, or 1500 feet in width, below the junction. He could see that the course formed a series of rapids, over which the water rushed violently. He could not find out the rise to flood from low water. From the same mountain he could also see the western branch, called by the Burmese Myitgyee, or the Great River, in contradistinction to the eastern branch, called Myit Ngeh, or Little River. He could not, however, see both these branches at once from the hill to compare them. But he could see the Irawadi below, and the Myitgyee, called by Kachins Maleeka, at the same time together. He considered, as far as he could judge from a comparison of the main river and its large branch, that the latter was over 500 paces wide above the junction, or over 1250 feet. This branch, though it entered on the western side, shortly took a northerly direction.

"He heard that boats could go up the Myitgyee for two or three miles, but not further. Rafts came down from the mountains, but no boats go up. A Kachin chief, Nga Kan-To, was hired by Mounng Alaga. He informed him that he had formerly dwelt on a hill some three days' journey up the Myitgyee. He said that enormous bodies of water came down this branch, rushing with great violence, rendering it impossible for the men on the rafts to hear each other speak. He said the great floods of the lower river all came from this branch, which was extremely great in its discharge compared with the eastern branch.

"He could learn nothing whatever of the river beyond the place from which the rafts came, which was about four days' raft journey downwards. These can make over 30 or 40 miles in a day. Beyond this the surveyor knows absolutely nothing of the large branch of the river.

"He personally visited the smaller branch, crossing it about five or six miles above the junction. It was then about 300 paces wide. The water rushed down with some violence through the rapids, although it was very low. He found the water still falling, although the Myitgyee water was rising. He learned that this smaller branch is itself formed of two branches,—one said to come from a lake; the other from the north-west. He went three days' journey up this branch, but did not see it again nor the eastern branch. He heard, however, that the river lessened in size in proceeding northwards. He could learn but little of the river, a Shan informant telling him he had been five days' journey further up, but that he knew nothing of the mountain. He had seen a lake on the eastern branch from which the river issued.

"On his return he arrived on the Irawadi above Shantayoke-ywa. He found that the surface had risen several feet, at least four or five, the velocity having increased, though nothing like what occurs in flood. The water came entirely from the western branch, and was said by the Burmese to come from the melting of the snows. Mounng Alaga himself says he saw heavy rain clouds passing over part of the country, and some of the smaller streams rise suddenly; but the discharge passing down was very small compared with the flood discharge. The people said it was usual for floods of this kind to come down in March and April. Very often great floods come down without there being any appearance of rain. These they ascribe to the melting snow."

I believe an explanation of the great eastern branch of the Irawadi which Wilcox heard of can be found in the fact that he was considering the large channel further east of his Khamti terminus only with reference to the branch he saw there.

If the Myit-gyee really maintains its size, as seen by Alaga, in the latitude of Khamti, it would doubtless be described to Wilcox as a large branch *eastern* to his then position, this great eastern branch being the main channel of the Sampo-Irawadi.

R. GORDON.

C. R. Markham, Esq., C.B., F.R.S., Secretary R.G.S.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—July 7th, 1882: M. VICTOR GUÉLIN in the Chair.—It was announced that the Geographical Society of Paris had opened a subscription for a marble bust of the unfortunate traveller Dr. Jules Crevaux, the news of whose death at the hands of Indians in the Gran Chaco had been officially confirmed since the last meeting. Hopes were expressed that the other French Geographical Societies would not be behindhand in supporting this movement. Dr. Crevaux was a native of Lorraine, but after the annexation of his native district to Germany he adopted Nancy as his place of residence. It was to Nancy that he always returned after each of his long and remarkable journeys, giving the members of the Société Géographique de l'Est, established at that city, the first account of his newest explorations. Various communications respecting the deceased traveller were read to the meeting. M. J. Laverrière read a letter from Señor Moreno, the Patagonian explorer, which had been published in many South American papers, among others *Le Messager du Brésil* of the 28th May, 1882. Señor Moreno relates that he saw Dr. Crevaux when he passed through Buenos Ayres, and that in the course of a long conversation which he had with him he told him that his intention was to explore the sources of the Paraguay; after having accomplished which he would cross the watershed to the Tapajos (a southern tributary of the Amazons), one of his companions (M. Billet, the astronomer) in the meantime exploring the Tocantins, another tributary of the same great river. But it was a matter of regret to the enthusiastic traveller that these rivers were already to a great extent known, and he longed for ground that was entirely new; the river Pilcomayo was thereupon suggested to him, the importance of which had been frequently pointed out, and the delineation of the course of which was still a desideratum, it being supposed that it would prove a means of communication between Paraguay and Bolivia. Dr. Crevaux gave attention to the suggestion and after spending a night in studying such maps and books as were likely to furnish him with information about the river, he next morning told his friends that he had decided to commence his explorations of the interior with this important river. His project was communicated to the Bolivian Minister and to Don Estevan Zeballos, President of the Argentine Geographical Institute, both of whom placed at his service all they knew of the region. At the end of the same week he was *en route*, full of hope. The sanguine feelings with which he entered on his journey are well shown by two letters written by him on the 15th March—the last probably he ever wrote. They have been published in Spanish, in the '*Jornal de Comercio de la Paz*' (Bolivia). He there speaks very highly of the reception he had received from Bolivians, especially at Tupiza and Tarija. The Prefect of the latter town, Señor S. Campero, gave him much assistance, and the Franciscan Fathers of the Convent at Tarja (Italians) furnished him with valuable information regarding the Indians of the Gran Chaco, and offered their services in the construction of his canoes. He was then on the eve of starting for the Pilcomayo, but he had begun to perceive that it was a much more difficult and costly undertaking than he had at

first imagined. Nevertheless, he was full of confidence; "Everything is going on well," he said, "we lack nothing, and are in the best of health." The news of the death of the unfortunate traveller and his companions caused great concern at Buenos Ayres. According to a letter written from this city by M. Marguin, it appears that it was at first intended to despatch two expeditions in search of the party. One of the expeditions, starting from Tupiza, was to descend along the left bank of the Pilcomayo, following exactly the line of route of the French expedition; the other, ascending the river, was not to stop until it had met with the land party. From the point where they met the two parties would operate together. But as the plan was not entirely approved by the Minister of War it was decided for the present to undertake only an expedition by water, which would prepare the way for a land party. A steamer, with its crew, has been placed at the service of the expedition, which is to be commanded by M. Fontana, a brave officer who has already made many voyages and is not new to hostile encounters with the Tobas Indians, the assassins of Dr. Crevaux and his companions. Arrived at the frontier the search party will take from the forts as strong a military escort as may be found necessary, perhaps to the extent of forty or fifty men, accustomed to Indian warfare and a wild life. The Geographical Society of Paris will be kept well informed of the proceedings of the expedition by M. Marguin, who will go with it. It is much to be hoped that the Gran Chaco will, as a result, be purged of the savage hordes who oppose all attempts to open it to science, commerce, and civilisation.—It was announced that the Minister of War had presented to the Society a copy of the map of French railways, on the scale of 1 : 800,000, compiled by the Intelligence Department of the French Army, and consisting of nine sheets. The map is engraved on zinc and printed in colours.—M. L. Gosselin described a new life-buoy, of which he was the inventor, and which is likely to be of great service to explorers in crossing rivers. The apparatus, which weighs only 12 to 14 ounces, and which can be held in the hand, is composed of three indiarubber tubes, communicating with a little tube for inflation from the mouth. If one of the tubes should break the other two would suffice to keep the body above water.—A copy of the 'Atlas Universel de Géographie,' a work thoroughly revised by Professor Maspero from the old 'Atlas de Géographie Militaire' used at St. Cyr, was laid on the table by M. M. Jouvet, the publisher.—A short paper was then read, sent by M. Veniukof, on "Trade with the recently opened ports of Korea." Among the imports he recommends cotton piece goods, flannels, hose, large-brimmed felt hats, boots and shoes, saddlery, arms, gunpowder, cutlery, ironware, and tools, as articles sure to meet with a brisk demand. Korea will have few articles of export; among them he thinks corn, timber, copper ore, skins, and furs, will be likely to furnish a trade. The Japanese, however, were already on the spot and will be powerful competitors of the European merchants.—A paper was next read on two new Chinese forage plants, by M. Maurice Emanuel. They are called "hei-teou" and "tsin-teou," and are calculated to take the place of oats in the food of horses. These plants are mentioned in a work published two years ago by the missionary, Père Leboucq. The experiment has been made of acclimatising the two plants in France, and according to report it has completely succeeded. The paper will be published in full in the *Compte-rendu* of the meeting.—Further letters were read from Lieutenant Gautier, who is on a mission in the northern part of Cochin China, letters which had appeared in the *Journal Officiel de la Cochinchine Française* for March, April, and May, 1882. They were to the effect that this traveller would remain for some years on the frontiers of Annam, Cambodia, and Cochin China, engaged in studying the language and mode of life of the wild tribes in that remote region.—Dr. Hamy informed the Meeting that M. Charnay was about to return to France from his archaeological

expedition in Mexico and Guatemala. He was at the present time in the city of Mexico. He had discovered the ruins of a large city in Yucatan, not less interesting than those of Palenque; the site of the city he had named "Lorillard," in honour of the public-spirited American gentleman who had so liberally defrayed the expenses of the expedition.—The meeting concluded with a paper "On his Travels among the Savages of Indo-China, East of the Mekong," by Dr. Neis.

— July 21st, 1882: M. DAUBRÉE, of the Institute, in the Chair.—The Chairman called attention to the fact that certain objects brought back by M. Vossion, French Consul at Khartúm, were now on view at the Society's house. He stated that M. A. Raffray, who is about to start for Madagascar, as Vice-Consul at Tamatave, was present, as was also M. Désiré Charnay, who had just returned from Yucatan. M. Charnay, addressing the Meeting briefly, gave an account of his travels, referring especially to the discovery of the ruins of a town in Yucatan, to which he gave the name of Lorillard (vide M. Hamy's communication at the meeting of July 7th). His intention is to give a more detailed account after the recess.—M. Mirabaud presented a photographic chart of the Island of Bourbon, on a scale thrice larger than that of Maillard, on the basis of which the new chart has been planned.—M. Desgodins sent a map showing the neutral zone between India and China.—Ensign Duboi sent a sketch of the Ogowé, the Rembo, and Lake Jonanga, visited by him in 1874.—A letter was read from M. Paul Sorin, from Kompong-thom (Cambodia) announcing that he had started for (Siemrab) Ankor with M. Aymonier. He will occupy himself with investigating the topography of the country, about which much remains to be noted; so far he has fixed a large number of geographical positions.—M. J. Henriet, engineer, presented an 'Almanach Annuaire de l'Empire Ottoman,' which he has just published. Having resided at Constantinople for many years, and having had numerous documents pass through his hands, this engineer, occasionally acting as geographer, has been struck with the erroneous impressions of Europeans with regard to the Turks and their empire. He holds that the Mussulmans are perfectly well informed of all which passes among the Western nations, and that it would be desirable that the latter should acquire an equal amount of information in regard to the Turks. In future years this Directory will be accompanied by maps of the Vilayets, or Departments, thereby adding to the interest of the work.—M. Léopold Hugo sent a memoir taken from an unpublished manuscript in his possession, on a voyage of the fleet of galleys from Marseilles to Algiers, and the return to Marseilles, in 1682. The recent restoration to the Musée de Marine (Louvre), under the direction of Admiral Paris, the Curator, of a model of a *grand galère*, gives interest to this memoir and to similar documents.—It was announced that an exhibition is now open at Bordeaux, to which the Colonial Government of New South Wales has sent a delegation. The Secretary of the delegation is a member of the Society (M. H. E. Bonnard, Consul-General at Sydney). He has been commissioned to study everything in connection with the wine-growing industry at Bordeaux. The instructions given to this delegate enter into much detail concerning the industry and commerce in wines of New South Wales. A copy of these instructions had been sent to the Society by M. Bonnard.—The Secretary called attention also to the Consular Reports (Parliamentary Papers), and to a very interesting report on the French colony of Cochín-China, and on Tonquin; and another on the wonderful prosperity of the port of Antwerp.—A Professor at the École Supérieure des Sciences d'Alger sent a work which he has just published on the following subject:—He holds that an organ exists in man and the superior animals for the perception of magnetic movements. It is by this means, he says, that animals are enabled to return to a certain known point, and by which they are guided in their migrations. He begs travellers to be good enough to collect and

communicate to him their observations on this subject. He commends himself to the notice of the residents at circumpolar stations, who are engaged in magnetic and meteorological observations.—M. Penchot, or Penchet, who has been travelling for thirty years, visiting China, Cochin-China, Japan, Asia, Africa, and America, writes on the subject of the massacre of the Crevaux Mission. He cannot believe that the authors of the murder are the Tobas, or Tébéis, as he calls them. He has himself spent three years in the midst of the Indians of the Gran Chaco, either alone or with the men he employed, and he has never been molested by the natives. But the immense rivers of these regions are full of islets, and these islets, in their turn, contain a dangerous population of marauders and pirates, who attack those who pass, when the latter are not in force. They are always ready to fall upon the first large boat which presents itself, if they expect a prize. M. Penchot maintains that they are in great part Italians; there are men of other nationalities, but Italians predominate. Thus, at Bahia Négra he has seen a band of sixty individuals, consisting chiefly of Italians, who were embarked in large decked boats, waiting a favourable opportunity to act. According to M. Penchot, the natives of the Pilcomayo and of the Rio Vermejo are much less to be feared than the river pirates just mentioned.—Colonel Veniukof sent a communication relative to the expedition undertaken last spring by M. Lessar to the Turkoman country east of Sarakhs. This Russian engineer is at present in Southern Turcomania. Having surveyed topographically the places passed through, he is now engaged in the construction of a map of the country between the Hari Rud, the Murghab, and the Oxus. Many Russian topographers are now engaged on the topographical survey of Southern Turcomania, and the parts bordering on Persia. The position of Sarakhs, the centre of operations, has been calculated to be $36^{\circ} 32' 14''$ N. lat., and $79^{\circ} 1' 34''$ east of Ferrol.—M. Maunoir gave some information with reference to the publication of the quarterly *Bulletin* of the Society. It is known that the mode of publication was changed at the beginning of this year; it being decided that a quarterly *Bulletin* should replace the old monthly publication, whilst a new publication appearing once a fortnight should give the reports of the meetings. The first number of the quarterly *Bulletin* has not yet been published; the delay arising from the maps not being ready. In this number will be found, in addition to a paper by M. Alph. Milne-Edwards, the most complete account which has yet appeared of the Flatters Mission in Africa. The second number is in the press, and the third will follow in due course.—The meeting would have closed with a discussion by M. L. Simonin, on the Channel Tunnel, but for the indisposition of that gentleman.—M. Quatrefoiges communicated a very interesting letter from Lieutenant Am. Gautier, who is on a mission to the north of Cochin-China. The letter (March 1882) was dated from the banks of the river named by the natives Diremain, called Tamboun in M. Dutreuil de Rhins' map.

— August 4th, 1882: M. ANTOINE D'ABBADIE in the Chair.—Extracts from a despatch of Dr. Harman, French consul at Bangkok, transmitted by the Foreign Minister, was read, relative to a rectification of the map of the Mei-nam delta. A sketch-map accompanying the remarks showed how defective is our knowledge of the country of Siam. He says these regions, even in the neighbourhood of the capital, still require careful exploration, and that the river Saraboung has quite a different course from that represented in existing maps.—A communication from the French African Colonial Company was read, announcing their intention to hold a series of geographical meetings at which 300 places would be reserved for members of the Society.—A copy of the work just published by M. A. Combanaire entitled 'Le Commerce Français dans l'Amerique du Sud,' was laid before the Meeting, and attention called to the project advocated by the author, namely, the establishment of

Chambers of Commerce in the various distant centres of trade; an institution of this kind had been founded by M. Combanaire at Lima.—M. J. Badin presented a plan of the fortress of Gibraltar as it existed at the commencement of the present century.—A note on Cape Matifou, to the east of Algiers, and on the adjoining districts as described in a manuscript of the date of 1682, was presented by M. Leopold Hugo.—M. Laroche announced that he was engaged in compiling a catalogue of the geographical works contained in English libraries, and exhibited a map of Ancient Gaul, reproduced on a large scale from the map of the brothers Sanson.—M. Germond de Lavigne submitted to the Meeting a paper by M. Paul Guyot, member of the recent Zambesi expedition, and relating chiefly to one of the affluents of that river.—The Chairman announced that the name of Crevaux, the French traveller, who had recently perished at the hands of Indians in the Gran Chaco, has been given to one of the new streets of Paris, by authority of the Municipal Council. A letter written by Crevaux not long before his death, was also read to the Society. It was addressed to Dr. Antonio Quijarro, Finance Minister of Bolivia, and dated San Francisco de Pilcomayo, 17th April, 1882. According to this letter some inhabitants of Caïza had recently killed several Matacos Indians, and that this tribe entertained projects of revenge. Crevaux suspected that this circumstance might operate very unfavourably on his own expedition, and that the Indians would pay little attention to his pacific declarations. This, in fact, is what did happen. He had hoped, however, for the best. His party was composed of 17 persons, of whom 5 were French, 2 Argentine sailors, and 8 young Bolivians. He had built four canoes of cedar, two of which were of light construction, and capable of being carried past the obstructions to navigation. The altitude of his starting-point he calculated at 1300 feet above sea-level, and he had read in old records of travel that there existed extensive lagoons along his line of route. He embarked provisions for forty-five days, and for armament had twelve Remington muskets with 1500 ball cartridges furnished by the Bolivian Government. The Indians had warned him that he would have to pass cataracts of formidable dimensions. In concluding his letter he recommended to the kind consideration of the Minister the Franciscan priests who had rendered him great services, and were deserving of Government support, inasmuch as they had gained over to civilisation 10,000 savages in Bolivian territory.—An address was then delivered by M. Jules Henriet, engineer in the Turkish service, on the Ottoman empire in a geographical point of view. He said it was erroneous to use the terms Turkey and the Turks, words which the Ottomans did not themselves employ. They called themselves Osmanlis, and their country the country of the Osmanlis. The division of their empire into European and Asiatic was also not used by them. But it was with regard to the administrative divisions that geographers in Western Europe committed the most errors. He had given full information regarding these divisions in the 'Annuaire de l'Empire Ottoman' a copy of which he had presented to the Society at the last meeting.

§ **Geographical Society of Berlin.**—April 8th, 1882: Dr. BASTIAN, President, in the Chair.—In opening the meeting the President referred to the recent appointment to the consulate of Tunis of his predecessor, Dr. Nachtigal, and expressed regret that the Society for a long time would be deprived of his services.—He next alluded to the loss which the Society and the scientific world had sustained through the death of Ed. Desors, who at one time had co-operated with Agassiz in the development of modern geological science, especially with regard to the Alps, and also in palæontological and prehistorical researches.—The President further communicated to the Meeting that news had been received from the Brothers Krause, Berlin, who for the last year had been engaged in investigating the natural history of the north-western part of America. Their letter was dated 15th February last. They state

that they made a journey from their wintering place, the mission station near Chilkat, to the Chilkat Indians, accompanied by the missionary and two Indians, and met with a very hospitable reception in the house of the chief "Tshartrich." During a stay of one week in a territory very seldom visited by white men, the travellers had frequent opportunities of becoming acquainted with the mode of life of this little-known race. They particularly mention the skill of these Indians in producing carved and painted articles for domestic use made of wood and from the horns of mountain sheep, of which the travellers obtained an interesting collection; they also state that salmon and trout are plentiful in the Chilkat river.—It was announced that news had been received from Mr. Flegel, now on a mission on behalf of the German African Society. His letter is dated from Benué, on the 17th and 21st February, and is not very encouraging. The jealousy and enmity of the chiefs in the towns of Kaffi and Loko and the intrigues of the caravan leaders whom Flegel intended to join, appear to have frustrated his hopes of travelling under safe protection through Adamawa; added to this was the loss of several instruments required for determining positions, which had] come to grief, partly in consequence of being badly secured, partly through the carelessness of his carriers. For these reasons the traveller was unable to fix with sufficient accuracy the positions of places last visited. In conclusion, he expressed a hope that he might be able to penetrate into the Adamawa country, with one servant only, but under such circumstances he would not be able to collect specimens or make accurate observations.—The President stated also that the topographical and archaeological investigations in Asia Minor would be continued at several places during this year, with the assistance of the Royal Academy of Science. In the meantime Mr. Carl Humann, the discoverer of the temple and altar on the Acropolis of Pergamos, had been commissioned to go from Brussa to Angora for the purpose of obtaining a complete impression of the "Monumentum Ancyranum," which contains an account of the deeds of the Emperor Augustus drawn up by himself; and as this long inscription is hidden by some Turkish houses, he is authorised to purchase these and have them pulled down. A second specimen of the same inscription is found in Uluburlu, the old Apollonia near Apamea, which he will likewise visit either now or on a subsequent occasion. Herr Humann has also been requested to explore the lower course of the Pursak, the great western affluent of the Sakaria river, of which we only possess some notice from Burbek, Ambassador of Emperor Ferdinand I., in 1555, and from the rather superficial surveys of the railway engineer Pressel, about the year 1870.—Professor Hirschfeldt, the archaeologist, will go to Eastern Bithynia, Paphlagonia, and Pontus, commencing his journey at Ismid. The Bavarian engineer, Fester, accompanied by Dr. Puchstein (supported by the Archaeological Institute), will examine the old Assyrian monument discovered by the former savant on the hill Nimrud Dag, westward of Diarbekr and north-west from Gerger. It is said to consist of a tumulus more than 100 feet high, built of hewn stones, with granite lions resting at the base. The monument is surrounded by twelve granite colossi about 50 feet high, and hollow inside. These travellers will also examine the ruins near Sachtzu-Gozu, a village to the east of Amanus, also the hitherto unopened mound on Mount Doluk near Aintab, and make everywhere topographical surveys.—It was further announced that another expedition, consisting of several Viennese savants, would start during the spring, under the direction of Professor Bendorf, for archaeological, geological, and topographical exploration; the intention being to visit Lycia and examine the monuments of Gjol-Baghtche and Tau; also to explore more minutely than had previously been done, the ancient Kyaneai, and if possible to transmit the relieves to Vienna.—The President in conclusion referred to the explorations of the French traveller M. Crevaux on the Pilcomayo.—The following

papers were then read:—"On his fifteen years' residence among the mountain tribes of the Himalaya," by Dr. Prochnow, and "On a Natural History journey in the Burzen country," by Dr. Paul Lehmann.

— May 7th, 1882: Dr. BASTIAN, President, in the Chair.—In opening the meeting the President, after alluding to the great loss science has sustained by the death of the celebrated Charles Darwin, and also by that of Sir Wyville Thomson, communicated the latest news regarding the members of the "*Jeannette* expedition." He then read a communication which had been received from Dr. Junker, whose long silence had given rise to the greatest anxiety. Dr. Emin Bey, Governor of the Egyptian Equatorial Province, on his return to Khartum in the beginning of March, forwarded several letters from Dr. Junker, who had now been travelling three years in those distant regions, and appears to pursue his journey notwithstanding the inevitable dangers from climate and natives. Emin Bey, who for the present has returned to his post at Lado, intends to visit the newly acquired territory of the Barambo people of Mesina, situated on the northern banks of the Uëlle river, where he intends to meet Dr. Junker. The latter writes that the western part of the Monbuttu territory is still unknown to him; he travelled during last year in the territory of Mambanga and the district formerly known as Munza, and has constructed a map of the A-Madi and A-Barambo country with its extension eastward as far as Tangasi (about three hours south of Munza's former residence "Seriba"). The whole territory of the A-Barambo was formerly subject to the authority of the Niam-Niam chief, "Kipa or Tikima," but is at present divided among innumerable small A-Barambo chiefs; although there are still some sons and distant relatives of Kipa in the country, they have but few followers.—A few only of the eastern A-Barambo chiefs had at present submitted to Egyptian rule.—Another letter contains the information that, two days' journey due south of his present station, there is said to be a river called Majo or Bâpi, which forms an important tributary to the Uëlle and flows towards the west. Beyond the Majo extends the territory of Bakangai, one of the most powerful sons of Kipa. The Monbuttu prince "Ssanga" resides in a south-easterly direction not far from the Majo; the Italian traveller Casati is now staying with him. Dr. Junker, according to his last letter, dated December 24th, 1881, addressed to Emin Bey, intends making a journey into Bakangai's country, returning through Kanna's, Bauli's, and Ssanga's territory to his present station, where he will await the arrival of Emin Bey.—This communication was followed by a Report by Captain Schleinitz on the expeditions for founding polar stations for scientific observation. He said that since the Executive Committee of the German Polar Commission had been appointed they had had to deal with great difficulties, arising partly from the hesitation of the German Government in fulfilling its promise to take part in these expeditions, in consequence of which the best stations for observations had been selected by other nations. They had also a difficulty in procuring a vessel fit for such a purpose with the small means at their command. Having decided to select Cumberland Sound for their station, they had at last succeeded in procuring a very suitable vessel, the schooner *Germania*, which had taken part in the second polar expedition. The *Germania*, after disembarking the staff of observers, &c., at their destination, will return, report the progress made, and remain in Hamburg until it is time for the expedition to return. The Polar Committee considered that a branch station in Labrador would be of good service, because the coast of this country extends along the line of the minimum of depression. It was therefore decided to send out an observer and also to secure the services of some of the German Moravian missionaries residing there; besides this branch station the North Pole will be

surrounded by the following observatories, now in course of foundation by expeditions from different nations:—

1. Jan Mayen—Austria-Hungary (fitted out by Count Hans Wilczek).
2. Godthaab, South-west Coast of Greenland—Denmark.
3. Lady Franklin Bay, North America (the northernmost of all stations)—United States.
4. Cumberland Sound—Germany.
5. Great Slave Lake—England.
6. Point Barrow—United States.
7. Mouth of the Lena—Russia.
8. Dickson Harbour—Holland.
9. Möller Bay, Novaya Zemlya—Russian branch station.
10. Sodankyla, near the Arctic circle—Finland.
11. Bossekop—Norway.
12. Spitzbergen—Sweden.

Far less attention has been given to the South Pole, where only two stations will be established, namely, at Cape Horn by France, and in South Georgia Island by Germany. It is expected, however, that the observatories at Cape Town and Melbourne will be of great assistance in this great scheme for combined observation. Germany sends out a staff of fifteen persons, besides eight assistants, to the stations selected. The work is to be limited to astronomical and meteorological observations, earth-currents and other magnetic phenomena, the latter of which will be observed synchronically in the north, by means of self-registering instruments. Corresponding observations will likewise be carried on at Wilhelmshafen. The expedition to the North will start in June, the other to the South about the end of May, namely, per mail steamer to Monte Video and from thence to South Georgia Island by the corvette *Moltke*. The Meeting was next addressed by Captain Hoffmann (Imperial German Navy), who communicated his observations on Coral Reefs in the South Pacific Ocean; followed by Dr. Kerber, who gave an account of his ascent of the volcano Colima in Mexico.

— June 3rd, 1882: Dr. BASTIAN, President, in the Chair.—The President announced the death of General v. Kauffmann, honorary member of the Society, and referred to the service he had rendered to science by his contributions to the geography of Central Asia.—The documents recently received from the expedition sent by the German East African Society to Lake Tanganyika, giving a detailed account of the expedition, were presented to the Meeting. They extend from June 1881 to January 1882. At the request of the Disha, presumptive successor to the Chief of Gonda, who died on the 18th of July, 1881, the expedition resolved to transfer their unhealthy station at Kakoma to the more salubrious position of Gonda. It was arranged that Dr. Boehm and Dr. Kaiser should make a journey of some months' duration to the southern part of Lake Tanganyika, while Mr. Reichard proceeded to Gonda to make the necessary preparations for a new station. For several months the Disha delayed this work by empty promises, and only in December 1881, when an ultimatum was sent to her, he succeeded so far as to obtain for the expedition, not only three great *tembos* (buildings), but also an extensive piece of land well suited for growing rice, which will be cultivated by the slaves of the Disha without any expense. Notwithstanding these apparently favourable conditions, this station seems to be exposed to many dangers; not alone is the expedition disturbed by the continuous intrigues of the Disha's husband, but also through the unsatisfactory state of the centre of Uganda and Unyanyembe, caused by the intrigues of Arab traders, both these states being constantly disturbed through the raids of three neighbouring chiefs,—in the north-west by the ill-famed Mirambo, in the south by

Simba, and in the south-west by Njuagu. Such a raid into Uganda by Mirambo was expected at the end of October 1881, when he victoriously returned from a similar nefarious expedition against his former friend Simba. However, Uganda escaped his ravages this time, but only because it would be considered dishonourable to attack a country which has no ruler. As the Disha is not yet declared as such, her proclamation is delayed as long as possible, and by this means an attack of Mirambo or any other robber is averted. In conclusion, Mr. Reichard expresses himself very decidedly against any sudden or forcible movement against slavery by Europeans, and he maintains that the fate of slaves, as soon as they have a master, is far more endurable than in their own country. During the time Mr. Reichard was detained in Gonda, Dr. Boehm and Dr. Kaiser had started (September 15) to visit Lake Tanganyika with the intention of extending their exploration northward along the western shore of the lake, starting from the Belgian station at Karema. On their journey they heard of the before-mentioned attack on Simba by his former friendly ally Mirambo, and were therefore obliged to take refuge on a mud island covered with reeds, in the Ugalla river, where they remained for seventeen days. In consequence of this involuntary detention they were forced to abandon their project of exploring the west coast of the lake, but they reached the Belgian station at Karema, where they were hospitably received by Captain Rammacker, who soon after died, being the last of the explorers sent by the King of the Belgians to Eastern Africa. The rainy season having begun, their stores being also greatly reduced, they decided to return to Gonda, where they arrived on the 16th December. A number of measurements based on astronomical observations made by Dr. Kaiser, and a more detailed account of their journey, will shortly be published in the 'Mittheilungen' of the German African Society, and a very extensive ornithological report will appear in another publication devoted to natural science. In concluding this report, it was remarked that all rumours of the establishment of other German mission stations along the shores of the Tanganyika were futile inventions, the object which the German expeditions in Africa pursue being exclusively scientific, and for this purpose only a fixed station was called into existence. The President, having alluded to the death of Captain Rammacker in Karema, spoke of the project of Messrs. Licata and Bianchi, in Italy, who intend to penetrate from the Bight of Biafra across the Cameroons Mountain into the territory which separates the Niger, the Congo, and Lake Chad. The President also communicated to the Meeting a more detailed account of Delaporte's return from the ruined cities of Cambodia, and stated that he had brought home collections rich in models of exquisite sculpture, such as Bastian had already minutely described in 1863, and that the hitherto unintelligible inscriptions had now been deciphered with the assistance of Dr. Kerns.—After these communications, Prof. Virchow gave an account of his recent journey in the Caucasus.

— July 8th, 1882: Dr. BASTIAN in the Chair.—At the commencement of the meeting the President called attention to the further details which had been received regarding the murder by Tobas Indians of Dr. Crevaux, the French South American traveller on the borders of Bolivia and the Argentine Republic. He then alluded to various expeditions, chiefly German, which were now in preparation or already on their way. First, with regard to Africa, he alluded to the French naturalist Le Petit, who had been pursuing his investigations in the neighbourhood of Landana, on the Loango coast, and who was now preparing to explore the mountainous country in the interior. He then spoke in high terms of De Brazza's enterprising and daring journey from the head-waters of the Ogowé to the Congo and thence by a new route overland to Landana, a journey which had especial interest for Germany, inasmuch as the German African Society's expedition under Dr. Güssfeldt

had attempted with little success in 1873 to penetrate, by the valley of the Quillu, into the mysterious country of Shintetje, which is the central point of trade between the interior and the coast. He said it was now known through Stanley's expedition that the Shintetje and the Bateke countries are one and the same. He then gave a *résumé* of the latest news regarding the expeditions sent out by the German African Society. He said the intended establishment of a station at Gonda in East Central Africa had been hindered by many difficulties. The chief of these were brought about by the intrigues of Bin Nasib, Wali of the Sultan of Zanzibar at Tabora, who had prevented the Sultana of Gonda from assuming her rightful authority over Ugunda, and consequently hindered the firm establishment of the German station in Gonda. An unhealthy season, caused by the stagnant waters left by the rainy season, had also operated unfavourably, Dr. Kaiser, the astronomer, having been for several months seriously ill with fever and ophthalmia. In order, however, not to remain wholly idle, Dr. Böhm and Herr Reichard had undertaken a short expedition to ascertain whether the stream running westward from Gonda was identical or not with the Ugalla river. Characteristic of this region are numerous shallow pools and lake-like basins, connected together by narrow channels choked with vegetation and forming in the wet season running streams. One of these watercourses, called by the natives Waga, was navigated by the travellers in a boat constructed by themselves in the month of March, and it was only by dint of great labour that they forced a passage, through barriers of *Pistia* growths, and the entangled jungle of low trees and woody creepers which grew both above and beneath the water surface. They reached at last the end, but only to discover that the Waga was not the same as the Ugalla, but connected with it simply, after heavy rainfalls, during the wet season.—With regard to the German expedition in the interior of Western Africa under Dr. Pöge and Lieut. Wissmann, of whom nothing had been heard since August 1881, the great anxiety caused by the long absence of news of those travellers had been relieved by the receipt of a long letter from Dr. Pöge dated November 27th, 1881, and written at the residence of the chief of the Tusselanga in about 6° S. lat. and 22° 22' 10" E. long. (Greenwich). The travellers had, in turning the territories of the Muata Yanvo, been obliged to take a north-easterly direction, and after forty-four days' march from Kimbunda crossed the Kassai on the 21st of October. The Kassai at this point had a width of about 350 yards. Here Wissmann separated from his companion and started in a southerly direction, whilst Dr. Pöge took a northerly course towards the territory of the Tusselanga, reaching on the 30th of October the residence of the chief Kalamba Mukenge. This place, with its well-built huts and its population of about 1000 souls, lies between the sources of two rivulets flowing towards the Lulua, and having excellent drinking water, and would form a capital site for a station if the Lulua should prove available for water communication with the yet unknown regions beyond. But it appears that this river, notwithstanding its breadth of more than 300 yards, is very shallow and full of rapids. Pöge describes the country as fertile; everywhere mandioca, maize, millet, and beans are cultivated, and the four kinds of oil-palms, which grow chiefly in the forests, are seen planted in the cultivated fields. Of game animals occur only the wart-hog and a small species of Cape buffalo, but the rivers are full of hippopotami and the woods of various species of *felidæ*. The grey parrot is also found here. The climate is warmer than in the Muata Yanvo's country, but everywhere salubrious, and the natives are friendly and peaceable. The chief articles of trade are slaves, especially female, and india-rubber, ivory being little dealt in. The chief market for ivory lies some eight days' journey to the N.N.W. of Mukenge, at a place called Kabao, in the Tukette country. With regard to his further movements,

Dr. Pöge hoped to leave Mukenge on the 29th of November, and to cross the Lulua and meet Lieut. Wissmann in Bacua-Carimba. Both would then, under the protection and guidance of the chief Kalamba-Mukenge, travel eastwards as far as the lake Mukanga, distant ten days' march, and then onward six days' march to the Mobondi-Stani, further two days' march to the Lubilash river, and two days' beyond that to the great Mobondi chief Fumo-Kole. As far as that point only was the traveller able to obtain information regarding the route. Should no insuperable obstacle be encountered, the travellers would travel along the trade road leading to Nyangwe on the Lubilash (the upper course of the Congo), reaching which place Pöge would return to Mukenge, whilst Wissmann would strike for Zanzibar. Pöge calculates that his journey to the Lubilash and back to Mukenge will take six months.—The President then alluded to the recent Russian expeditions: Ivanitzky on the Petchora, Elisseejef in Russian Lapland, Malakof in the Ural, Walter in Eastern Russia, and Regel in the Pamir.—In conclusion, the following papers were read:—Dr. Neumayer on the scientific equipment of the German polar stations; Herr Meydenbauer on the application of photogrammetry in travel, and Dr. Falkenstein on a surgical and medicinal outfit for travellers.—The Society then adjourned for the summer vacation.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Gsell-Fels, [Dr.] Th.—*Italien in sechzig Tagen.* Zweite Auflage, mit Nachträgen bis 1882. Leipzig (Meyer's bibliographisches Institut): 1882, 12mo., pp. xiv. & 846, maps and plans. (*Dulau*: price 8s.)

North Italy, Rome and Central Italy, and South Italy and Sicily have already appeared (in six parts) in the series of Meyer's *Reisebücher* to which this wonderfully condensed and complete guide-book belongs. Six maps and eighteen coloured plans materially assist the text, which includes copious historical, archaeological, and fine-art notes, in addition to the topographical and other matter of especial use to tourists.

L'Europe Illustrée.—Nos. 17-21, 24 and 25. Zurich (Orell, Füssli, & C^{ie}) and London (C. Smith & Son, 63, Charing Cross): 12mo., illustrations. (*Dulau*.)

These continuing numbers of the well-illustrated series issued by the above-named Swiss publishers, describe Milan (by J. Hardmeyer), Schaffhausen and the falls of the Rhine, Ragaz-Pfäfers, the baths of Krenth in Upper Bavaria, Einsiedeln, and the baths of Reinerz (by P. Dengler). Maps or plans are given in nearly every case, and the average price is 1s.

Perret, Paul.—*Les Pyrénées Françaises. II. Le Pays Basque et la Basse-Navarre.* Paris (Oudin): 1882, large 8vo., pp. 496, illustrations. (*Dulau*: price 9s.)

Continues the work of which vol. i. was noticed in last year's 'Proceedings,' p. 574. As before, some of the engravings (for instance, that of the Pic de Ger, p. 435) represent excellently the prominent physical features of the land described. A third volume, including Tarbes, Luchon, Perpignan, &c., will complete the series.

Samuelson, James.—*Roumania, past and present.* London (Longmans, Green, & Co.): 1882, 8vo., pp. xiv. and 289, maps, autotypes, and woodcuts. Price 16s.

This work is divided into two parts, of which the first contains geographical, descriptive, and topographical matter, with chapters referring to the Danube

navigation, and the commercial, agricultural, pastoral, educational, ethnographical, archæological, and judicial aspects of the country; and the second is wholly historical. Among the subjects contained in the Appendices, there is a table of the movements and settlements of nationalities and barbarian tribes, and a useful list of works referring to Roumania. The well-executed woodcuts (in some cases from photographs) are mostly of ethnographical and archæological interest; the maps (constructed by Mr. Weller from the latest authorities and the author's notes) are physical and historical, on the scale of 45 miles to the inch.

In discussing the advantageous geographical conditions and valuable natural products of Roumania, the author refers to its exceptional climate. Both its winters and summers are very trying and severe, spring is so short as to be almost non-existent, and the cold east wind that sweeps down on it over the steppes of Asiatic Russia often causes life to be almost intolerable on the plains, whilst the sudden change from heat to cold between noon and evening in the later months of the year is another unpleasant feature. Rain is, however, comparatively slight and seldom of long duration, and a long and genial autumn prevails.

Strausz, Adolf.—Bosnien: Land und Leute. Historisch-ethnographisch-geographische Schilderung. Erster Band. Wien (Carl Gerold's Sohn): 1882, 8vo., pp. xii. and 340. (*Williams & Norgate*: price 7s.)

This first volume deals exclusively with the historical and ethnographical aspects.

ASIA.

Blumentritt, Ferdinand.—Vocabular einzelner Ausdrücke und Redensarten, welche dem Spanischen der philippinischen Inseln eigenthümlich sind. Mit einem Anhang: Bibliotheca Philippina. Alphabetisch geordnete Sammlung einer Anzahl von Druckschriften und Manuscripten linguistischen, geographischen, ethnographischen, historischen und naturwissenschaftl. Inhalts, die auf die Philippinen Bezug haben. Leitmeritz: 1882, 8vo., pp. viii. and 132.

This valuable compilation (which is exclusively for private distribution) is an extract from the xvi. Jahresberichte of the Communal-Ober-Realschule at Leitmeritz, in Austria. The vocabulary consists of 79 pages of words and expressions (with their scientific and other equivalents) peculiar to the Spanish language as used in the Philippine islands. The "Bibliotheca" contains references to printed matter and manuscripts (1) on linguistic subjects, divided under dialects, and (2) on the geographical and other aspects referred to in the title.

Garnier, Francis.—De Paris au Tibet. Notes de Voyages. Paris (Hachette): 1882, 12mo., pp. xliii. and 422 [no Index], map and illustrations. (*Dulau*: price 2s. 8d.)

A posthumous re-issue of the series of letters written by this deeply-regretted explorer to the French journal *Le Temps*, with the addition of a memoir by him, summarising the scientific results of his voyage in Central China (from the 'Bulletin' of the French Geographical Society, Ser. 6, vol. vii., 1874, with the accompanying map), and of a posthumous paper by him from the *Revue Scientifique* on the status of France in the far East.

Lühdorf, Aug. [Baron] von.—Die heissen Quellen am Amur bei Neu-Michailowsk im Bezirke Nicolajefsk. Hamburg (Gustav Diedrich & Co.): 1882, 8vo., pp. 15, plan.

Baron Lühdorf (a recently elected Fellow of our Society) here gives a sketch of the position, present condition, chemical constituents, and medical pathology of the hot springs near New Nicolaiefsk, which have apparently ceased to attract attention since the removal of the Russian North Pacific port to Vladivostok.

Midden-Sumatra.—Reizen en Onderzoekingen der Sumatra-Expeditie, uitgerust door het Aardrijkskundig Genootschap, 1877-1879, beschreven door de Leden der Expeditie, onder Toezicht van Prof. P. J. Veth. Leiden (Brill): 1882, 5 parts sm. 4to., atlas fo.

This further continuation of the great work describing and illustrating the geographical and other scientific results of the late Dutch expedition into Central Sumatra (of which the commencement was noticed in our 'Proceedings' for 1880, p. 588, and the continuation in the volume for 1881, p. 441), consists of:—

- I. 3de Aflevering. Reisverhaal, Tweede Gedeelte, beschreven door C. H. Cornelissen, A. L. van Hasselt, en Joh. F. Snelleman, Leden der Expeditie. Pp. viii. & 318, pls. i.-ix., map.

This part is complete in itself, and concludes the portion of the work referring to the incidents of the journey, containing also some observations on travelling with a scientific object in the Netherlands Indies. The plates, both of ethnographical and geographical subjects, are as before characteristic and well executed: the last two are of practical use for future travellers. The map (scale 1:1,000,000) covers the whole of the region traversed by the expedition.

- II. 3de Aflevering. Aardrijkskundige Beschrijving, door D. D. Veth, Lid der Sumatra-Expeditie. Pp. 137-168, Title &c.

Completes the geographically descriptive portion, containing the geology and mineralogy (with lists of rock-formations and mineral substances), and sketches of the physical configuration, vegetation, and animal life.

The folio atlas mentioned in the title illustrates this section, and is now completed by a map of the southern part of the highlands of the Padang Residency (scale 1:250,000), geological sketch maps of the extreme southern part of these highlands and of the north-western portion of the Palembang Residency, profiles of various routes, and the first sheet of the chart of the mouth of the Batang Hari.

- III. 3de Aflevering. Volksbeschrijving en Taal, door A. L. van Hasselt. Eerste Gedeelte, eerste Afdeling, Volksbeschrijving, pp. 81-430 & i.-x. [containing title &c., and completing the first part of the first section of the ethnographical and linguistic parts of the work].

The second part of the section is also completed by pp. 25-63, and pls. lxiv.-cxviii., with title &c. (dated 1881) "Ethnographische Atlas van Midden-Sumatra, met verklarenden Tekst." This part is also illustrated by two sheets of pedigrees, &c., of the sovereigns of Jambi and Palembang. The second or linguistic section has been already completed.

- IV. 3de Aflevering. Natuurlijke Historie, door Joh. F. Snelleman. Met Medewerking van vele binnen- en buitenlandsche Geleerden. .

Contains the commencement of Part 1, Mammalia and Aves, by Snelleman, pp. 1-8 (Mammals only), and pls. i.-iv. of Aves; the commencement of Part 6, Coleoptera, by C. Ritsema and various specialists, pp. 1-72 and pl. i.; the index to Part 9, Diptera; and the commencement of Part 11a, Araneae, by A. W. M. van Hasselt, pp. 1-56, pls. i.-v.

This Natural History section is therefore the only one now remaining incomplete.

Moura, J.—Le Royaume du Cambodge. Paris (Leroux): 1882, Livraison 1, large 8vo., pp. 32, illustrations. (*Dulau.*)

The commencement of a descriptive work (price 1*l.* 5*s.*) intended to be completed in 30 livraisons issued weekly.

Müller, Ferdinand.—*Unter Tungusen und Jakuten. Erlebnisse und Ergebnisse der Olenék-Expedition der Kaiserlich Russischen geographischen Gesellschaft in St. Petersburg.* Leipzig (Brockhaus): 1882, 8vo., pp. x. and 326 [no Index], map and illustrations. (Dulau: price 7s. 2d.)

The attention recently directed to the great rivers of Siberia (more especially as regards the Lena, in consequence of the establishment at its mouth of the first Russian International Polar Station on Weyprecht's scheme) has induced the author to add to the literature of popularly-written scientific travels his own account, mostly in journal form and written at the time of the Eastern Siberian Expedition, sent out at the end of 1873 by the Russian Geographical Society under the geologist Alexander Czekanówsky of Irkutsk, for the exploration of the then practically unknown rivers, the Lower Tungúska and the Olenék. The chief features of this journey have already appeared both in Russian (in the 'Izvestia' of the Society, vol. xii., pp. 161 *et seq.*) and German ('Russische Revue,' vol. ix., 1876, pp. 66–75). In March, 1873, Müller and Czekanówsky made a preliminary journey, including a visit to Lake Kossogól, during which they reached the Yenissei near Turuchansk by the Lower Tungúska, returning in November to Irkutsk viâ Krasnoyarsk. On the second and more important journey, the Upper Lena was followed as before, from Irkutsk to Banshtshikowa, from which point the neighbouring head-waters of the Tungúska were reached and that river was followed northwards until it turns west towards the Yenissei, when the travellers continued north across the Anáon mountains to the head of the Olenék, which they followed to its mouth in the Arctic Ocean. On the return, they struck south-east to Siktjak on the Lena, descending that river to Bulun, and travelling east and south until they arrived at Werchoyansk on the Yana, from which point they continued south across the Aldan affluent of the Lena to Yakutsk, and followed the Upper Lena home to Irkutsk, which was reached in January 1875. Both routes are shown on the sketch map, scale 1:7,840,000.

The flora of the Olenék region, the geological relations of the lower Tungúska, and the temperatures of various positions above the snow-line, are discussed in separate Appendices to this work, which contains much detailed information on the Tungus and Yakuts, and a special general sketch of Siberia.

Newall, [Major-General] D. J. F.—*The Highlands of India strategically considered, with special reference to their colonisation as Reserve Circles, military, industrial, and sanitary.* London (Harrison & Sons), and Newport, I. of Wight (Brannon): 1882, 8vo., pp. xiii., 20, & 274, map, sections, views, &c. [no Index]. Price 21s.

The author, who has delivered professional lectures on the subject of Military Colonisation (one of which forms the introduction to the present work), here examines the strategic aspects of the existing Indian Sanitaria and Hill Stations, especially as to their adaptability to form sites for military or other colonies as "reserve circles." He merely claims to give short descriptive sketches of the surrounding country, with historical notes on some of the tribes, incidental hints for routes, and a few geological and topographical notes; but the discussion of his subject is entirely based upon points of physical geography, which are copiously illustrated by upwards of eighty outline views, mostly from original sketches,—a few being from acknowledged authentic sources, including our own 'Proceedings.' The map is a panoramic view of the Indian peninsula, showing watersheds and strategic bases suitable for military occupation, &c., with a table of heights.

AFRICA.

Assab.—*Provvedimenti per la Costituzione e l'Ordinamento di una Colonia Italiana in Assab. Relazione Ministeriale e Disegno di Legge presentati al Parlamento Italiano dal Ministro degli Affari Esteri (Mancini) nella tornata del 12 Giugno, 1882.* [Rome: 1882.] 4to., pp. 66, maps.

Assab.—Assab et les Limites de la Souveraineté Turco-Égyptienne dans la Mer Rouge. Mémoire du Gouvernement Italien. Rome (Imprimerie Héritiers Botta): 1882, 4to., pp. 37, maps.

The Library is indebted to the courtesy of Professor G. Dalla Vedova, the present Secretary-General of the Italian Geographical Society, for copies of these official publications, which are naturally of especial interest at the present juncture. The first, issued by the Italian Minister for Foreign Affairs, is purely of political and financial interest; the maps accompanying it (reproduced with French modifications in the second treatise) are: 1, of the southern part of the Red Sea from Suakim to Aden (scale 1 : 2,700,000), with inset of Assab (scale 1 : 700,000); 2, of the Bay of Assab and its vicinity, by Guido Cora, from original Italian surveys, on the scale of 1 : 250,000.

The second memoir is of more general scope, commencing with a bibliographical list of thirty-one works bearing on the region, and discussing all available authorities, historical and geographical, with the object of disproving the title of Turkey or its Egyptian dependency to the whole west coast of the Red Sea, and the consequent validity of the purchase by the Rubattino Company of the Assab district.

Pennazzi, Luigi.—Spedizione Pennazzi-Bessone, dal Po ai due Nili. I. A dorso di Camello. Milano (Treves): 1882, 12mo., pp. xiii. & 351, maps and plans. (*Dulau*: price 3s.)

Count Pennazzi and Lieut. Bessone started in the early spring of 1880, under the auspices of Capt. Camperio, Director of the *Esploratore*, for the purpose of aiding in the national work of establishing Italian commerce in North-Eastern Africa; and this work contains the commencement of the description (in journal form) of the regions traversed by them, from Suakim to Massowah, Kerem, and Kassala, with incidental references to historical, hydrographical, ethnographical, and political subjects. Lieut. Bessone contributes maps illustrating the route from Massowah to Kerem, Kerem to Degga, and Degga to Kassala, with plans of Massowah, Sebtarat, and Kassala.

Brief notes on the Barrea language, and the geology and agricultural capabilities, &c., of the country between Massowah and Kassala are given in the Appendix.

Taylor, Ellen M.—Madeira: its Scenery, and how to see it. With letters of a year's Residence, and lists of the Trees, Flowers, Ferns, and Seaweeds. London (Stanford): 1882, cr. 8vo., pp. xvi. & 261, map, plan, and frontispiece. Price 7s. 6d..

Although not touching on the geology or meteorology of Madeira, or its climate from the medical aspect, this little descriptive volume conveys a very clear idea of the physical conditions of the island, containing also much useful matter for intending visitors, and altogether supplying a want in the current English literature of its kind. Special attention is paid to Botany. The map is on the scale of 3 miles to the inch, and the plan of Funchal 140 yards to the inch.

A printer's error on p. 58 gives the present population as 33,000, instead of (in round numbers) 133,000.

AMERICA.

The Bermudas.—The History of the Bermudæ or Summer Islands. Edited, from a MS. in the Sloane Collection, British Museum, by General Sir J. Henry Lefroy, B.A., C.B., K.C.M.G., F.R.S., &c., formerly Governor of the Bermudas; author of 'Memorials of the Discovery and Early Settlement of the Bermudas or Somers Islands.' London: printed for the Hakluyt Society (Richards, 37 Great Queen Street, W.C.): 1882, 8vo., pp. xii. and 326, map and plates.

Forms No. LXV. of the works issued by the Hakluyt Society. The MS. now for the first time printed, although with no title-page or date, and contain-

ing no direct clue as to its author, bears sufficient internal evidence to satisfy so good an authority as Sir H. Lefroy that it is an unpublished work of Captain John Smith, the historian of Virginia, supplying some wants of the editor's 'Memorials' referred to in the title. A reproduction of Smith's 1623 map from Norwood's survey, with various surrounding drawings of forts, &c., is given; also Smith's portrait, a portrait of Sir George Sommers, and a drawing of his loadstone. The Appendix contains various matters of historical interest.

ARCTIC.

Hovgaard, A.—The Danish-Arctic Expedition proposed by A. Hovgaard, Lieutenant of the Royal Danish Navy, lately member of the *Vega* Expedition. Translated from the Danish by G. Zachariae. Copenhagen (Gyldendalske Boghandel): 1882, 8vo., pp. 30, map. (*Dulau*: price 1s.)

The author gives his reasons for supposing that Franz-Josef Land extends to the neighbourhood of Cape Chelyuskin, and that its eastern point turns to the north; and he successfully urges the fitting out of a Danish reconnoitring expedition (which has just started) to corroborate these views, and to examine whether the circumstances of currents and ice are such that a basis for further polar voyages could be reached in this direction without too great risk.

GENERAL.

Deisenhammer, [Dr.] Carl.—Meine Reise um die Welt. Wien (Carl Gerold's Sohn): 1882, 8vo., pp. viii. and 791 [no Index]. (*Williams & Norgate*: price 12s.)

Incidents and deductions (chiefly on commercial and botanical subjects) during the author's journey from England to North America, San Francisco, the Sandwich and Fiji islands, New Zealand, Tasmania, Australia, Singapore, Java, Hong Kong, Canton, Japan, Ceylon, India, and Egypt.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

Arnoldi.—Karte der Umgegend von Hannover. Scale 1:25,000 or 2·9 inches to a geographical mile. 4 sheets. Hannover. Price 7s. (*Dulau*.)

Dachsel, A.—Karte von Schandau und Umgebung. Scale 1:12,500 or 5·8 inches to a geographical mile. Schandau, Lewuhn. Price 1s. (*Dulau*.)

Gerster, R.—Carte du canal de Corinthe concédé au Général Türr, dessiné par Ch. Muret. Paris, Delagrave. (*Dulau*.)

Mercator, Gérard.—La Grande Carte de Flandre dressée en 1540 par Gérard Mercator. Reproduction phototypique de l'exemplaire conservé au Musée Plantin-Moretus, exécutée d'après les ordres de l'Administration Communale d'Anvers par Jos. Maes, Photographe; et précédée d'une notice explicative par le Docteur J. van Raemdonck. Anvers, 1882. (*Dulau*.)

This map is composed of nine sheets, and is an exact reproduction of Gérard Mercator's great map of Flanders, which was engraved and published at Louvain in the year 1540, and of which the only known copy is at present in the "Musée Plantin-Moretus" at Antwerp, it having been bought at a public sale in 1877, for the city of Antwerp, by the Keeper of Records, M. P. Génard. At

the date of its purchase the map was slightly damaged by damp, and the "Administration Communale" taking into consideration the possibility of its destruction, either by accident or the ravages of time, determined to have it reproduced by a phototype process on the exact scale of the original; this has been very successfully done by M. J. Maes of Antwerp, and the reproduction is in all respects equal to a new edition of the original map of 1540. It has also the advantage of an elaborate introduction by Dr. van Raemdonck.

Ministre de l'Intérieur.—Carte de France, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—XII.—16, le Mans (Nord). XII.—18, la Flèche. XII.—21, Mirebeau. XII.—23, la Mothe St. Héray. XII.—24, Ruffec. XIII.—9, Fécamp. XIV.—22, Le Blanc. XVIII.—16, Sens. Price of each sheet 7*d.* (*Dulau.*)

Oschatz.—Wandkarte der Bitterfelder Kreises. Scale 1:40,000 or 1·8 inches to a geographical mile. 4 sheets. Halle, Reichardt. Price 12*s.* (*Dulau.*)

Petters, H., und Waltenberger, H.—Karte der Alpen vom Bodensee bis Wien und Triest. Augsburg, Lampart. Price 3*s.* (*Dulau.*)

Sineck, D.—Situations-Plan von Berlin mit dem Weichbilde und Charlottenburg. Scale 1:10,000 or 7·2 inches to a geographical mile. Berlin, D. Reimer. 4 sheets. 1882. Price 5*s.* (*Dulau.*)

Steinhauser, A.—Strassen-Karte d. Königreich Ungarn, nebst Kroatien und Slavonien. Scale 1:296,000 or 4·1 geographical miles to an inch. Wien, Artaria & Co. Price 4*s.* (*Dulau.*)

ASIA.

Indian Government Surveys:—

General Maps: India, 1881. Preliminary edition. Scale 32 miles to 1 inch. On 6 sheets.—Indian Atlas. No. 32 N.E. Parts of Hissar and Sirsa, Bickaneer, and Loharu. No. 36 S.E. British Manpur; also parts of Jabua [Jhabua], Gwalior, Indore, and Dhar. No. 130 S.E. Part of Naga Hills Frontier. No. 131. Parts of Cachar and Manipur.—Levels in the Punjab, compiled from Canal, Railway, and other Surveys, and combined with the operations of the G. T. Survey. Sheet No. 75. Parts of Ferozepore, Ludhiana, &c., with letterpress. Scale 2 miles to 1 inch; size 40 inches by 27.

Bengal Presidency: Lower Provinces: Map of Eastern Bengal. Sheet 8. Second edition. Hill Tipperah, &c. Scale 8 miles to 1 inch.—District Dacca, 1857-60. New edition, 1881. Scale 4 miles to 1 inch; size 26 inches by 26.—District Midnapore. Lower Provinces (Revenue) Survey, 1881. Scale 1 mile to 1 inch. Sheets 8, 11, 14. Sheet 14 includes part of District Balasore in Orissa Division.—District Noakholly. Lower Provinces Revenue Survey, 1881. Scale 1 mile to 1 inch. Sheets 2, 3, 7, 8.—Darjeeling District: Map of Darjeeling. Hill-shaded. Surveyed in seasons 1878-80. In four sheets. Scale 20 inches to 1 mile; size 96 inches by 40.—Map of Darjeeling Bazar. Also of the Native Town and Lloyd Botanic Garden, and some adjacent lands, 1878-80. Scale 60 inches to 1 mile; size 27 inches by 40.—Portion of the Government Cinchona Plantation, Darjeeling. Surveyed during 1874-75. Reduced from the maps on the scale of 16 inches to 1 mile to the scale of 8 inches to 1 mile in 1879-80; size 40 inches by 27.—Map of Hope Town, Darjeeling District. Hills not shaded. Surveyed during 1878-79 and 1880-81. Scale 4 inches to 1 mile;

size 40 inches by 27.—Map of Hope Town, Darjeeling District. Hills not shaded. Surveyed during 1878-79 and 1880-81. Scale 4 inches to 1 mile; size 40 inches by 27.—Map of the locations in Hope Town, Darjeeling District. Surveyed during 1878-79. Scale 8 inches to 1 mile; size 22 inches by 30.—North-West Provinces: District Saharanpur. Seasons 1878-79-80. Scale 2 inches to 1 mile. Sheets 14 N.E., N.W., S.E., S.W.—Hazara District: Huttet Camp, Khyra Gali. Surveyed season 1880-81. Scale 12 inches to 1 mile; size 26 inches by 34.—Huttet Camps at Bara Gali and Kalabagh. Surveyed season 1880-81. Scale 12 inches to 1 mile; size 40 inches by 27.—Proposed Huttet Camps at Ghor Dhaka and Kunja Gali. Surveyed season 1880-81. Scale 12 inches to 1 mile; size 40 inches by 27.—Rawalpindi District: Huttet Camp at Thobba. Surveyed season 1880-81. Scale 12 miles to 1 inch; size 26 inches by 34.—Simla District: Cantonment of Dagshai, 1880-81. (On the Kalka Road.) Scale 24 inches to 1 mile. On five sheets; size of each 40 inches by 27.—Cantonment of Solon, 1880-81. Scale 24 inches to 1 mile; size 40 inches by 27.—Bannu District: Bannu District Punjab (Revenue) Survey. Seasons 1874-75 and 1878-79. Sheets 3, 11. Scale 1 mile to 1 inch; size 40 inches by 27.—Mysore: Mysore Topographical Survey, 1879-80. Sheet 18. Part of Shimoga. Scale 1 mile to 1 inch; size 40 inches by 27.—Assam: Assam. In nine sheets. Sheet 5, and sheets 7 and 8 on one sheet. Second edition, 1881. Scale 8 miles to 1 inch; size 22 inches by 30.

Bombay Presidency: Deccan Topographical Survey, 1881. Sheets 29, 29A, 31, 33, 34, 46 including Malcolm Peth, 50, 50A, 54, 55, 56.—Guzerat: Sheet No. 5 of Guzerat, parts of Baroda and Mahi Kanta, 1881. Scale 1 inch to 1 mile; size 28 inches by 42.

Turkestan: Turkestan and the countries between the British and Russian Dominions. Fifth edition, 1881. On four sheets. Scale 32 miles to 1 inch.

NOTE.—The names in brackets [] are authorised spellings.

AFRICA.

Bellefonds, M. Linant de.—Carte Hydrographique de la Basse Égypte et d'une Partie de l'Isthme de Suez. Gravée au Dépôt de la Guerre en 1855 d'après les Travaux de M. Linant de Bellefonds. Revue et complétée en 1882 pour les Chemins de Fer et le Canal de Suez. Scale 1:250,000 or 3·4 geographical miles to an inch. 4 sheets. Price 5s. (*Dulau.*)

The principal points in which this new edition of M. Linant de Bellefonds' map of Lower Egypt differs from the previous edition of 1855, are the following:—All the water has been coloured blue, thus showing the canals, &c., more distinctly. The Suez Canal, and all railways constructed since the first edition was published, are given, while the "Profil de l'Isthme de Suez selon la ligne des terrains les plus bas et selon la ligne de la communication à établir directement d'une mer à l'autre," together with several notes, have been omitted.

In the N.W. corner of sheet No. 1, is an inset plan entitled "Croquis du Fort du Barrage à la bifurcation des deux branches du Nil au N.O. du Caire," this is not on the first edition.

With these exceptions, this edition appears to be much the same as the one issued in 1855, but differs considerably from the new map recently published by the Intelligence Department of the War Office.

Cora, Guido.—Carta Speciale della Baia d'Assab ed Adiacenze, costrutta e disegnata specialmente secondo Rilievi Originali Italiani da Guido Cora. Scale

1:250,000 or 3·4 geographical miles to an inch. Torino: Guido Cora, 1882, (*Dulau*.)

This map includes the Italian possessions between the Bay of Bailul and Raheitá. The surrounding country, for a distance of from 10 to 20 miles inland, is given, as laid down by Italian naval officers, and other explorers. The conformation, and positions of some of the islands in this map do not at all agree with those given in the Admiralty Chart.

Horton, Surgeon-Major J. A. B., M.D., F.R.G.S.—Map of Wassaw and Ahanta, Gold Coast, Western Africa. By Surgeon-Major J. A. B. Horton, M.D., F.R.G.S. 1882.

This map has no projection, scale, or explanatory notes of the figures or symbols employed.

Intelligence Department, War Office.—Map of Lower Egypt. Scale 1:200,000 or 2·7 geographical miles to an inch. With inset plans of Cairo (1:18,000), Alexandria (1:31,000), Port Said (1:50,000), Suez (1:50,000), and Ismailia (1:20,000). Accompanied by one sheet of letterpress giving the explanation of the terms which are commonly met with in the map. Intelligence Department, War Office. London, 1882. 4 sheets.

— General Plan of Defences of Alexandria. Scale 1:36,400 or 2 inches to a geographical mile. Intelligence Department, War Office. 1882.

Petermann's 'Geographische Mittheilungen.'—Gallieni's Expedition in die Gebiete am Oberen Senegal & Niger, 1880 & 1881. Nach den Karten der Expedition, den Aufnahmen unter Commandant Derrien, 1880–81, und den Arbeiten früherer Reisender gezeichnet v. B. Domann. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Taf. 14. Gotha, Justus Perthes. (*Dulau*.)

— V. S. Gouldsbury's Expedition zum Oberen Gambia und in Futa-Djallon 1. Februar bis 18. April 1881. Nach den Aufnahmen des Lt. H. N. Dumbleton und zur Übersicht aller in das Gebiet fallenden Routen von Mungo Park bis Aimé Olivier de Sanderval, gezeichnet von B. Hassenstein. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Taf. 13. (*Dulau*.)

AMERICA.

Rand, McNally, & Co.—General Map of the Republic of Mexico, constructed from the best authorities, showing completed and proposed Railways, Steamship Routes, and Telegraphic Communications. Scale 1:2,175,000 or 29·7 geographical miles to an inch. Rand, McNally, & Co., Chicago. 1882. On Rollers, varnished.

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in March, April, May, and June 1882.

No.		Inches.	
953	m =	0·48	Japan:—Omai-saki, to the gulf of Yedo, including Suruga gulf and Sagami-ura. Price 2s. 6d.
2854	{m =	1·5	Gulf of Mexico:—Tampico harbour. Approaches to Vera Cruz. Price 2s.
	{m =	0·55	
494	{m =	13·5	West Indies, Martinique:—Fort de France harbour. Fort de France (Fort Royal) bay. Cul-de-sac Marin. Price 1s. 6d.
	{m =	2·5	

No.		Inches.	
242	m =	2·0	India, west coast :—Sadashivgad bay and river, with port Karwar. Price 1s. 6d.
270	m =	0·18	China Sea :—Macclesfield bank. Price 6d.
98	m =	1·28	West Indies, Cuba :—Approaches to ports Casilda and Masio, with the adjacent anchorages. Price 1s.
1178	m =	0·5	England, west coast :—Trevose head to Bull point. (Plan, Morte bay.) Price 1s. 6d.
1342	m =	0·09	Cochin China :—Phan-rang bay to Tong-king gulf. (Plans, Hué river or Thruong Thien, Touron bay, Phuyen and Cou-mong harbours, Vung-gang bay.) Price 2s. 6d.
887	m =	0·67	South America, Magellan strait :—English, Crooked, Long, and Sea reaches. Price 2s. 6d.
2860	m =	0·87	North America, east coast :—Savannah river to St. Helena sound, including Calibogne sound, port Royal, and Broad river. Price 2s. 6d.
2861	m =	0·87	North America, east coast :—St. Helena sound to Charleston harbour, including the North and South Edisto rivers. Price 2s. 6d.
304	m =	5·0	France, west coast :—Port Louis and Lorient. Price 1s. 6d.
612	m =	0·9	North America, east coast :—Little Spoon island to Pemaquid point, including entrance to Penobscot bay. Price 2s. 6d.
905	m =	0·5	Fiji islands :—Suva harbour to Levuka, with the adjacent islands to the eastward, Ngau, Nairai, Mbaliki, Wakaya, and Makongai. Price 2s. 6d.
644	m =	1·0	Africa, south-east coast :—Delagoa bay (Lorenzo Marques) Price 2s.
623	{ m = 0·17 m = 7·0 m = 0·75 }		Africa, west coast :—Fernando Po island (plans, Santa Isabel [Clarence] and adjacent bays. San Carlos [George] bay). Price 1s. 6d.
1598	m =	0·09	English channel. Price 4s.
496	m =	0·08	South Indian ocean :—Saya de Malha bank. Price 1s.
450	m =	0·21	West Indies :—Pedro bank and adjacent coast of Jamaica (plans, Banner reef, Middle and South-west cays. North-east cay. Portland rock). Price 1s. 6d.
691	m =	2·0	Australia, north-east coast : Normanby sound and Prince of Wales channel. Price 1s.
160	m =	0·18	Italy, west coast :—Civita Vecchia, to Policastro. (Plans, Port Anzo. Gaeta bay. Agropoli bay. Mouth of the Tiber.) Price 2s. 6d.
146	m =	2·0	Africa, west coast :—Niger river (Nun entrance). Brass river. Price 1s. 6d.
628	{ m = 2·0 m = 0·9 }		Africa, west coast :—Opobo river. Quaebo river. Price 1s.
622	m =	1·4	Africa, west coast :—Bonny and New Calabar rivers. Price 1s. 6d.
2046	m =	3·0	Ireland, south coast :—Waterford harbour. Price 2s. 6d.
259 a	m =	0·6	St. Lawrence river :—Montreal to Ogden island. Price 2s.
259 b	m =	0·6	St. Lawrence river :—Ogden island to Kingston. Price 2s.
1862	Plan added. River Benin entrance.		
97	Plan added. Selwyn bay.		
	(J. D. Potter, agent.)		

CHARTS CANCELLED.

No.		Cancelled by	No.
2601	Tampico harbour	New plan, Tampico harbour ..	2854
494	Fort Royal bay	New plan, Fort de France har- bour, &c.	494
496	Trinité bay		
497	Cul de sac Marin, &c.		
242	Sedashigar bay, &c.	New plan, Sadashivgad bay and river	242
1342	Phan-rang bay to Touron bay ..	New chart, Phan-rang bay to Tong-king gulf	1342
1264	Touron bay to gulf of Tong-king		
1011	Phuyen harbour		
1268	Touron bay		
2860	Port Royal and Calibogue sounds	New chart, Savannah river to St. Helena sound	2860
2826	Savannah river and Calibogue sound		
2861	St. Helena sound	New chart, St. Helena sound to Charleston harbour	2861
2859	North Edisto river		
644	Delagoa bay	New plan, Delagoa bay	644
623	Clarence, Isabel, &c., bays ..	New chart, Fernando Po island ..	623
1598	English channel	New chart, English channel ..	1598
691	Normanby sound and Prince of Wales channel	New plan, Normanby sound and Prince of Wales channel	691
159	Civita Vecchia to bay of Naples ..		
160	Naples to cape Vaticano	New chart, Civita Vecchia to Policastro	160
620	Benin river entrance	New plan, river Benin entrance on chart	1862
146	Brass and St. Nicholas rivers ..		
628	Opobo and Quaabo rivers	New plan, Niger river (Nun en- trance), Brass river	146
622	Bonny and New Calabar rivers ..		
2046	Waterford harbour	New plan, Opobo river, Quaabo river	628
498	Grande and Petite Anse D'Arlet.		
2902	a, b. Thames river to St. Abbs head.	New plan, Bonny and New Cala- bar rivers	622
2896	Ipswich and Annisquam harbours.		
2879	Cape Cod or Provincetown harbour.	New plan, Waterford harbour ..	2046

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1179. England, west coast:—Bristol Channel. 1452. Bahama islands:—Nassau harbour. 2245. Channel islands:—Alderney harbour. 274. North Polar chart, Atlantic side. 278. North Polar chart, Pacific side. 260. North Polar sea. 2435. North Polar sea:—Mackenzie river to Behring strait. 952. Japan:—Owasi bay to Takamatsu-no-saki. 71c. India, east coast:—Coromandel coast. 2471. North America, east coast:—New London harbour, Connecticut river. 2375. Australia, north coast:—Torres strait, western channels. 54. Korea:—Port Lazaref, Shin Po anchorage, &c. 2050. England, south coast:—Spithead and approach from the eastward. 2172. North America, west coast:—Behring strait. 2177. Arctic sea:—Baffin bay. 2282. Arctic ocean and Greenland sea. 941a. Eastern archipelago, western portion. 1944. North America, west coast:—Port Acapulco. 243. Mediterranean:—Port of Alexandria. 447. Australia, north coast:—Western approaches to Torres strait. 2892. North America, east coast:—Narraganset bay.

2252. Baltic sea :—Gulf of Bothnia. 2239. Baltic sea :—St. Petersburg bay and city. 2023. Malacca strait :—Singapore New harbour. 2205. Black sea :—Kertch strait. 4. Indian ocean :—Principal groups of Chagos archipelago. 1887. North sea :—Eider river to Blaavand point. (*J. D. Potter, agent.*)

ATLASES.

Bartholomew, John, F.R.G.S.—Philips' Handy Atlas of the Counties of Scotland. Constructed by John Bartholomew, F.R.G.S. With consulting index. London, George Philip & Son. 1882. Price 3s. 6d.

This little Atlas contains a large amount of information, showing as it does all the principal means of communication, parishes, &c., and forms a useful guide for tourists. Map 1 is a general railway map of Scotland, and is followed by separate maps of each county, arranged alphabetically, with a copious Index at the end of the atlas.

Chavanne, Dr. Josef.—Physikalisch-statistischer Hand-Atlas von Oesterreich-Ungarn in 24 Karten mit erläuterndem Text unter Mitwirkung von Vinzenz v. Haardt, Prof. Dr. Anton Kerner Ritter v. Marilaun, Franz Ritter v. Le Monnier, General-Major Carl Sonklar v. Innstätten, Prof. Dr. Franz Toula, herausgegeben von Dr. Josef Chavanne und ausgeführt in Eduard Hölzel's Geographischem Institute. 1. Lieferung. Wien, Eduard Hölzel, 1882. Price 7s. (*Dulau.*)

Gaebler, Ed.—Special-Atlas der berühmtesten und besuchtesten Gegenden und Städte Deutschlands und der Alpen. 100 Karten. Scale 1:125,000 or 1·7 geographical mile to an inch. Ein Ergänzungswerk für jeden Handatlas. Lief. 1, containing 4 sheets. Price 4s. To be completed in 25 parts. Leipzig-Neustadt, Gaebler. (*Dulau.*)

Swiss Federal Government.—Topographischer Atlas der Schweiz im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 vom eidgenössischen Stabsbureau veröffentlicht. Scale 1:25,000 or 2·9 inches to a geographical mile. Lief. 20. Bern. Price 13s. (*Dulau.*)

MAP OF EASTERN PROVINCES OF MADAGASCAR

showing part of the
HIGHER AND BARA COUNTRY
described by the Rev. W. Deans Cowan.

Scale 1 Inch = 7.7 Miles

Some are underlined, thus: Ambositramanjaka.
Areas shaded green are covered with forest.

Residences of Hova Governor.

The summits of which are covered with wood. The people are very
dependent, and do not acknowledge the Hovas. Ratsindrasofina
Maraoty and Matitanana. Small villages of from 10 to 20 houses
the Divisions; Zafimanina, Zafandriamanana, Sandrakandro,
Mahasila and Manamaka. There are, however, three other smaller
pays tribute: they have also to furnish 6000 men in time of war.
division of Chiefs) are practically independent, pay no tribute to Hovas
the tribes of Vohitroso, Manambondro, Safina and Ampedongy are also
Ambodirano, Zafimery, Tamino, Hobina, are directly under Hova rule.

Angina, under Ramaharo.
descendent of former Kings.

Avaradrano.
Balanginanin.
Manitranofoity.
Ivohibato.

III. Arandrano, under Ralainony.
descendent of former Kings.

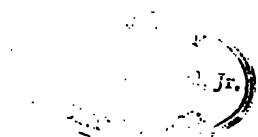
Masiatra.
Isandranto.
Evandrotrana.
Mandranofoity.
Homatrano.

partly,

V. Avaradrano.

the few towns of importance in Betsileo. The people live in homesteads which





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The Cameroons District, West Africa. By GEORGE GRENFELL.

Map, p. 648.

By way of introduction, I may state that at the close of 1874 I was sent out to the Cameroons river by the Baptist Missionary Society, and with the exception of the time occupied by a short trip to this country, I have lived either in that district or on the Congo up to the close of last year. During my seven years' residence on the West Coast I have travelled some 1300 miles on foot and over 5000 miles in canoes or small boats, in going backwards and forwards between places to the interior of the Cameroons and Congo, and have been enabled to gather information which may be of interest to the Royal Geographical Society, relating as some of it does to places previously unvisited by any European.

Stretching away eastward from the Cameroons is one of the vastest unexplored regions which has yet to yield up its secrets to the enterprise of the traveller. The entrance to the river is of such a promising character, affording as it does a 20-mile channel for vessels drawing 16 feet of water, that one is disappointed when he finds it furnishes an available waterway of only some 70 miles or so into this unknown district.

The estuary of the Cameroons receives the whole of the waters of the three streams from the north-east and east—the Yabiang or Abo river, the main stream or Cameroons, and the Lungasi branch. This estuary also receives a portion of the waters of the northern stream known on our modern maps as the Bimbia river, the old Jamur, but more properly the Mungo river; it also receives a portion of the waters of the Edea river. The other portions of the waters of these two rivers find their way into the sea at points about 15 miles north and south of Cape Suellaba respectively.

The Mungo river stretches away north almost for as great a distance as the main stream does in a north-east direction, but it is not nearly so

large a body of water, being navigable for only very light boats in the dry season. Beyond the Mungo towns it is bordered by well-defined banks, but below, it immediately enters upon the swamp region and divides into three and, after a few miles, into numberless channels which become so shallow as to be available only when the tide is in.

The Abo branch, though short and small, is a very important avenue for trade, the hills on both sides being peopled by a large and influential tribe.

The main stream is barred by cataracts (in about $10^{\circ} 7' E.$ long. and $4^{\circ} 30' N.$ lat.) at about 70 miles north-east from the entrance to the river. Its banks are peopled by four distinct tribes—the Duallas, the Wuri, the Budiman, and the Endokoko people. The Duallas trade with the Wuri people, and they in their turn with the Budiman, who in their turn buy from and sell to the Endokokos, each barrier to communication being strictly preserved in the interests of those concerned.

The Lungasi branch is navigable for boats and canoes as far eastward as the main branch, but is there barred by a cataract at a point some 25 miles south of Endokoko.

The Edea river, which so far as I can learn has not yet been ascended by any other European than myself, offers the best facilities for navigation, affording as it does a channel for boats drawing four feet of water, right up to the falls some 35 miles from the coast.

These three streams—the Cameroons, the Lungasi, and the Edea—afford means of access to about the same meridian of longitude. In the case of the two former, progress becomes impossible by reason of the cataract region through which they pass, their courses lying between steep hills and cliffs and among immense boulders. The Edea finds its way from the higher region, apparently common to all these streams, over a series of some half-dozen falls of about 20 feet in height, arranged horse-shoe shape, and extending for nearly a mile. The body of water falling over these gneiss rocks is quite equal to, if indeed it does not surpass, that which comes over the cataract at Endokoko, but instead of its stream being augmented as it travels seaward, as in the case of the Cameroons, it is split up, making the three streams which figure on our charts as the Qua Qua, the Borno, and the Borea. It has been surmised for a long time that these two latter were mouths of one and the same stream, and I am able to state that they are so. The best means of access to the Edea is through the Qua Qua creek, the mouths of the Borno and the Borea being very uncertain, and altering from season to season.

Within a radius of 15 miles from Suellaba Point the land is uninhabitable. Mangrove swamps cover nearly the whole of that portion of the area which is not entirely the domain of the water. There are a few places where hard ground is to be found, and there the fishermen build their huts and stay for a few days during the

fishing season, and also when they go down river to catch the shrimps which are so abundant, and from which the river takes its name.

The whole of this area is intersected by a most elaborate network of creeks, affording ready communication for boats of four feet draught, between Malimba, about 15 miles south of Cape Suellaba, and Bimbia, some 15 miles north of that point. By the aid of a prismatic compass and a watch, and after repeated journeyings, I have laid down on the accompanying map an outline of the principal of these creeks.

Beyond this swampy region, red clayey ground gradually rises to various heights up to 60 feet, forming sites for the towns nearest the sea-coast, such as Mungo, Hickory, Bell Town, Akwa Town, the Bassa towns, and also those of Yansocki and Yabakalaki. Bimbia, on the sea-coast, is built on one of the spurs of the great mountain itself. Beyond this belt of elevated red clayey ground comes another swampy district intersected by a further series of small creeks, and this is followed by the hilly country covered with dense forest where we find the Balung, Abo, Budiman, and Lungasi towns. Reaching this belt of country, communication by land with the interior becomes a possibility; for the swamps and creeks render the inhabitants of the lower towns virtually islanders. From some of the higher points the hills are seen stretching away in all directions, and clothed as they are in all the luxuriance of tropical foliage, they make up a most enchanting picture. Though decidedly hilly, the country does not threaten those difficulties to road-making which obtain in the cataract region of the Congo, the hills being much less precipitous.

The Balung and Abo towns to the north are far from being dependent upon water communication for their supplies of barter goods. Cameroons is the more accessible market, but Old Calabar is always available by an overland route which is kept open. The Wuri people are also able to relieve their most pressing wants, such as their need for salt and tobacco, by the same route, when by reason of any of the many pretexts for so doing, their communication with the Cameroons traders is interrupted.

The Lungasi people seem to be quite cut off from any other market than Cameroons, but their trading relationships are of the slenderest. They seem to occupy an almost isolated position, and when I went among them about four years ago (I was the first white man who visited them) I found them worse off for European manufactured goods than any people I have seen either before or since; worse off even than the much decried Basundi of the Congo. They grew their own tobacco, and as they went naked, did not want cloth; what they did for salt was not plain; but this was evident, that little or no trade was carried on with the surrounding people.

The Edea towns are supplied with trade goods by the people lower down the river, who in their turn are supplied by the Balimbos or the

Bakokos, and these again obtain what is needed either from the Cameroons traders, or those established on the sea-coast further south. So, although the Edea towns are close to the supplies, yet all traffic has to filter through two or three sets of middlemen, who almost kill the trade by their exactions.

Although the region embraced within the lower reaches of the Cameroons river and its tributaries is so small, yet there are distinct dialects for each of the separate districts. The mountain people speak Bakwilleh, the Bimbia people Isubu, and the Cameroons language is called Dualla. The Abo, Wuri, and Qua Qua towns have each their own dialect, as have also the Lungasi and Edea towns. These dialects are all more or less intimately related; and no doubt if they were reduced to writing, the relationship would be much more apparent than is the case in their oral use. Most of the people have some acquaintance with the dialect spoken by their neighbours with whom they trade, but seldom have the ability to speak more than one dialect besides their own. These people are all members of the great Bantu stock, and are allied in race and language with the Swaheli in the east and the Kafirs far away south. They are quite distinct from their neighbours at Calabar, who belong to the stock which has its habitat stretching away to the north and west, and who speak a language belonging to quite another class. One of the many differences I have noticed as marking the members of these two great families, is to be found in the mode in which they respectively climb their palm trees when taking the sap from which they make their palm wine. The Bantus make use of the well-known band or hoop of strong fibrous material to assist in the ascent, while the negro of the Ethiopic stock relies solely upon his arms and legs.

Although the natives of the Cameroons district all belong to the one stock, yet, as I have already stated, there is a great diversity of language over a very limited area, and not only in language does this diversity exist, but in modes of living and in their pursuits. The mountain men are hunters and breeders of cattle. Mungo men are makers of canoes, and the most skilful of their craft I have met with. Balung people have large farms, and also carry on a large trade. Abo men are skilled handicraftsmen as well as keen traders. Wuri men do little else than barter with their neighbours. South of Wuri the people are satisfied with a minimum of European goods; nature is bountiful, and they seem content.

The mountain people build detached houses, while Balung people build a whole side of a street capable of accommodating 500 people under one continuous roof, with here and there a large apartment or common hall that will hold ten or twenty families. Each family of the Abo people occupies its own small street, its houses being elevated on small mounds a couple of feet or so above the surrounding level. Their

towns are mostly on the tops of the hills which flank the river, and are often reached by flights of steps cut in the hillside. The Wuri people build after the same fashion, but close to the water's edge. There the purpose of the mound becomes apparent, for in the rainy season it often happens that each house becomes an island. South and east of Cameroons the same plan of building isolated houses on mounds is in practice, though there is no more apparent need for such a precaution than on the hill-tops at Abo. Perhaps the practice points to migration at some period from a location liable to inundation.

The Duallas hold a tradition that they came from the south-east. Seven generations ago, they say, Lungasi people were stronger than the Duallas, and drove them away to the water-side, where they learned to make canoes and to catch fish. One day when fishing off what we call Malimba Point on the chart, but what they call Mbiende, they observed a plantain skin floating down with the tide, and they argued therefrom, that where there were people to eat plantain, there were people who would be willing to change plantain for fish. So going up, where the plantain skin came down, they found the Bassa people located where Bell and Akwa towns now stand. Constant visits to the new market resulted in their coveting the land, and afterwards, in their taking it away from the Bassas whom they drove into the forest. The Bassas still supply the Duallas with plantain, a regular market being maintained at the back of the towns.

Whoever taught the Duallas to make canoes succeeded very well, and showed them how to get a bigger canoe out of a small tree than any others of their race whom I have met, can manage to do. Their canoes are segments of circles both longitudinally and transversely. They taper off to a point at each end, but much more gradually at the bow than the stern. They are made of all kinds of wood, from that of the soft cotton-wood (a species of *Bombax*) to that of the hard and durable red timber or bar-wood of commerce; and of all sizes up to those capable of carrying a crew of sixty paddlers. In making these canoes the logs are flattened slightly at the top, by means of native implements. The shaping of the outside is the next work, and this is followed by the hewing out, or "dubbing" process, which is maintained till the sides are not more than an inch thick. When this result has been attained a brisk fire is kindled outside and in, and stretchers are applied while the timber is willing to yield to the influence of the heat and pressure, and the converging sides are forced apart, so that the log which had a diameter of three feet is made to give a canoe four feet and a half in width.

The special ability of the Abo men is manifest in working both wood and iron. They carve very elaborate stools out of solid blocks of wood, and also make ornamental chests and doors. The iron they use is brought from the coast in the form of old cask and bale hoops, and

this they work up into very creditable edge tools, swords, and hoes. Their ability and persistent industry place them in the front rank among the Cameroons tribes.

As is usual in Africa, the hoe is the only agricultural implement, and the wielding of this is left to the women and children. When a man marries he builds a house and clears a patch of ground; he then looks to his wife to provide the needful food in the way of plantains, yams, sweet potatoes, ground-nuts, beans, maize or cassada. The wife is not supposed to furnish the fish or the flesh, and if the husband does not provide these by his hunting or his trade, he may not quarrel if he is reduced to a vegetable diet. On the uplands plantains and yams are the staple food, on the lowlands and river banks cassada pudding is the mainstay; this is prepared by tying the grated cassada pulp in plantain leaves and boiling it. As polygamy prevails, the wives take it in turn to provide for their lord and master; and as all the wives are bought or inherited—a man succeeding to those of his father—this lordship is anything but a nominal matter, and a woman is quite willing to share with others in her husband's affection, seeing that it results in such a welcome modification of her responsibilities.

Domestic fowls, goats, hairy sheep, and pigs are fairly plentiful, the last, however, are reserved for the men, it not being lawful for a woman to eat pork. Monkeys, porcupines, and deer are the most frequent products of the chase, and are important items in their dietary. On the mountain, dogs are very much appreciated, and I have seen a goat given for a dog that would not yield half as much dressed meat. The flesh of the baboon is also highly esteemed, so is that of the pangolin. While the python is accepted as an article of food, rats are rejected, but Congo people do not even draw the line at rats.

Fish are caught in great abundance at certain seasons, some by means of hooks and some by means of seines. Baited traps, after the fashion of the simple mouse-trap, are very common along the banks of the river up country. Large baskets, on the principle of our "crab pots," set where the current is strong, secure a good supply, as also do nets stretched across the mouths of small tidal creeks. The fishermen on the sea-shore at the foot of the mountain are intrepid in their calling, they will venture out alone in their small canoes in the whaling season (August to October), and attack and sometimes succeed in killing a young whale and in landing it. Bimbia people and the people up the Edea sometimes kill the manatee, the flesh of which is highly prized, as is also that of the sawfish and the turtle, which latter is abundant.

As hunters the Cameroons men are not bold. He who ventures to attack a leopard is a brave man, and his fame is sung. They never hunt the elephant, though these are numerous 30 miles up the Mungo, and on the banks near the mouths of the Borea and the Borno. They

think they do their utmost when they "make medicine" to prevent the ravages these beasts periodically make among their farms. Hippopotami abound in large numbers about 50 miles up the main stream of the Cameroons river, and also up the Lungasi and Edea rivers.

The mountain men or Bakwilleh have hunting grounds at all heights up to 8000 or 9000 feet above the sea. They do not, however, build their towns at a greater altitude than 2500 feet. Scarcity of water is one reason, the cold air is another, and again, their chief food, the plantain, does not flourish above the 3000 feet level. The oil palm produces its fruit at 1700 feet, but the coco-nut at this height yields no harvest, and the oil palm 500 feet above gives nothing but the sap from which they make their palm wine. At 3000 feet, tree ferns commence, and no more palms are seen. Water is so scarce at many of the mountain villages that the cattle have to depend entirely upon the copious dews. A few bullocks are found here and there on the mountain, while none are found upon the plains.

There is a magnificent cascade on the mountain near Boanda (1800 feet altitude), and this has been named the Thomson falls, after its discoverer. In the dry season the water is but a small stream, but during the rains it is a grand torrent, having a clear drop of 50 feet at the point mentioned.

Natives on the one side of the mountain wishing to go to places on the other side, or towards the other side, do not thread their way in and out and up and down among the various lesser hills and spurs which surround the main cone, but ascend beyond the wood belt (8000 feet) and pass round the main cone till above the place to which they are journeying, and then descend to it. They feel the cold very much when they ascend to the higher regions. In March 1878, I registered a minimum of 58° Fahr. at Manu's spring, and at 12,000 feet a minimum of 47°. The cold mountain breezes which reach the sea-coast in the early mornings during the dry season are very invigorating to the Europeans; this is especially the case when the mountain is capped with snow. The most comfortable time for travellers to ascend the mountain is undoubtedly during the dry season, from October to February. In March the tornado season commences, but in between the storms the atmosphere is wonderfully clear, and one is well repaid for the exposure to the storm by the prospect afforded of the surrounding country. The peak of Fernando Po westward, and the hills of the cataract region eastward, are the boundaries in these directions of a glorious map-like picture, embracing river, sea, and land. Southward all detail is lost in the haze of the far distance. The best route for the ascent is from Bota through Mokunda and Boanda, and not *viâ* Mapanja and the lava beds, the course taken by Captain Burton in his memorable first ascent of the Cameroons mountain.

The range of climate and temperature on the sides of the mountain,

and in the fertile valleys found here and there among the small hills surrounding the main cone, offer every advantage for the production of fruit and vegetable which cannot possibly be grown on the plains. The soil being mainly of volcanic origin is especially rich. Coffee is indigenous, not only on the mountain but in the lower districts bordering on the river, where once having got past the marshy zone the ground is of a character which promises the most magnificent results if the natives could only be induced to cultivate either coffee or cacao. The planting of cacao on the island of Fernando Po and at Victoria (the Baptist Missionary Society's settlement at the foot of the mountain) has been pushed forward vigorously. The results, though comparatively small at present, are such as have encouraged the people to commence the work on their own account. Cacao involves so much less labour in its preparation for the market than coffee, that it is much better adapted for a country where labour is notoriously scarce. The great difficulty with indiarubber, which abounds, is the amount of work involved in its collection. Coco-nuts alone might produce a wonderful revenue for the country, but no one has spirit enough to undertake their cultivation. The harvest is too far off, and is altogether too problematical to prove an inducement to the native mind, notwithstanding that those who have coco-palms esteem them very highly on account of the market value of the copra. Among the fruits produced in the district are pineapples, mangoes, guavas, oranges, limes, citrons, bread fruit, bread nut, sour sop, custard apple, and cashews. Among the valuable timbers are ebony, African oak, a kind of teak, a wood resembling mahogany, and also bar-wood. These are all of greater specific gravity than water. There are also several lighter varieties, easily wrought, and much used for building purposes. The tall mangrove yields a splendid hard timber for posts, and also makes capital firewood; it burns readily though used green, and gives an intense heat. There is another species of mangrove, easily mistaken for the foregoing, but it is quite valueless as fuel.

It is useless to look to the coast tribes for development of the resources of the country; they, together with the river-side people, are thoroughly imbued with a passion for bartering, and do little else than attend to their trade, exchanging European manufactures, such as cotton goods, cutlery, guns, powder, beads, and spirits, for the palm oil, palm kernels, and ivory of the interior. These water-side tribes have a monopoly of the direct trade with the European, and will not allow the up-country people to go on board ship or into the white man's trading factory. They reserve to themselves the privileges of middlemen, and secure thereby a good share of the proceeds for themselves. That they are jealous of such privileges, affording as these do such an easy mode of supplying the necessities and luxuries of life, is not at all to be wondered at, and goes without saying.

The standard of value is a bar of iron 8 feet long, $1\frac{1}{4}$ inch wide, and $\frac{1}{4}$ inch thick. 20 bars = 1 kroo or 10 gallons of palm oil; a goat = 20 to 100 bars; a fowl costs one bar; a wife 600 to 1500, that is on the river; mountain women do not cost so much.

The Bimbians, Bell town, Akwa town, and Malimba people reserve to themselves the right of trading with the white men on board ship. The Bimbians collect from the mountain markets, the Bell people work the Mungo and Abo rivers, the Akwa people doing nearly the whole of the trade on the Wuri river and that of the Dibamba towns on the Lungasi branch. The Qua Qua is common ground for both Akwa and Bell. Malimba people also trade with the Qua Qua people and up the Edea. The Mungo, Abo, Wuri, and Qua Qua (or Bakoko) people in their turn act as middlemen between the natives of the interior and the Cameroons men, and also get their profit, and the result is that the poor people, to whom the lion's share is due as the producers, get anything but their right, and are thereby deterred from doing more than suffices to supply their more pressing needs.

The rainy season is the busy time with the traders, as they can then take their canoes up the creeks to towns which they cannot reach in the "dries," save by an overland walk, a very objectionable matter where heavy produce has to be dealt with.

The difficulty of penetrating into the interior from Cameroons mainly results from the jealousy with which these trading zones are maintained. The natives fear that the white man in passing beyond will effectually break the barriers they have set up, and which they maintain so much to their profit. So determined are they to preserve these boundaries, that I was brought back by a party of eighty armed men from a point some 20 miles beyond the Mungo towns past which I managed to creep in the darkness of the night. I was thus prevented from following up to the cataracts the only branch of the Cameroons whose whole navigable length I had not traversed. On a previous occasion, had it not been that I was travelling on board a small steamboat, I should not have been able to reach the Edea falls. As it was, we were boarded by a party of armed men, and bidden to stop. I referred them to the engine, and told them to stop it if they liked. They did not like; they were afraid it might display some eccentricity if meddled with, and as we were fast approaching the limits of the territory where they were masters, they got into their canoe and dropped astern. I may say that a pump, the nozzle of which had a universal joint, was judiciously displayed by one of our crew, and it evidently impressed our visitors as a mysterious and powerful weapon, and tended in no small degree, I believe, to secure our immunity from interference.

I am convinced from what I have seen that our present trading enterprises have only touched the very fringe of this part of the continent. The exorbitant demands of the middlemen make it not

worth while to send produce across the many barriers interposed between the coast and the districts much over 100 miles inland.

The Arabs penetrate from the north-east to within no very great distance of the Cameroons. Several natives have recognised my jackass as being after the fashion of the beasts ridden by the light-coloured men who wore turbans and carried guns and spears. The question how long this part of the continent is to be kept a sealed book depends upon how long the coast tribes are able to preserve their monopoly. The interior tribes are anxious to come down to the coast and trade the same as in Angola and Loango, and if so many profits were not exacted upon each parcel of produce it would pay to bring it from much greater distances than are tapped by the present system of trade. The existence of the monopoly which now obtains of course precludes the possibility of obtaining carriers or guides for interior explorations, and furnishes perhaps the most direct obstacle to the setting out of an expedition from this part of the coast.

Not only is progress into the country barred, but the advancement of the country is kept in check by the conservatism that is dominant. Many of the natives are anxious to improve themselves, and to adopt at least some of the manners of civilised life; but such ambition is effectually restrained by the medicine men and secret societies. There is no security for life or property, and a disposition to improve the old style of living, or to accumulate property by industry, is so dangerous to gratify that those who would willingly take the lead are deterred by the possibility of losing both property and life.

The principal secret societies in the Cameroons are Je-engu and Elung; there are others of less importance, such as Moonge and Kungaloo; these together form a no small factor in the governing power of the country. The kings or chiefs are much influenced by these societies as well as by the popular voice. It is a most difficult matter to bring criminals to justice if they belong to important families. Slaves have but short shrift and no mercy.

A civilised government, able to protect life and property, would be one of the greatest boons that could fall to the lot of these people; and while I would reprobate anything which savoured of pandering to "earth-hunger," I should heartily rejoice to see more and more of the coast brought under the rule of civilised powers; and I am patriotic enough to wish that it should be the British power that should thus extend the area over which it spreads its wings, impressed as I am that it is the most beneficent. So far as spreading its wings over the Cameroons is concerned, it would involve us in nothing but a little expense, for the people so appreciate the blessings of a just and able government, that they have petitioned more than once to be annexed to the territory which is so evidently prospering under British rule. The expense would only be for a few years, for the increased trade would soon

produce sufficient revenue to cover it. Such a step would in a short time result in the opening up of vast areas and ready markets for the products of our unemployed and poorly-paid labour, a matter of no little importance to a country such as our own.

The importance of opening up new districts for trade is fully realised by our continental neighbours. The French have already secured by treaty with the native chiefs a tract of country on the long central reach of the Congo, at that part nearest their own territory at Gaboon. This acquisition promises to be of great profit to the French nation, and any form of civilised government (excepting Portuguese) cannot fail to be a great blessing to the people themselves.

With respect to the people, I may, in concluding, say, that I have found among them evidences of capacity of no mean order, and I have been served by faithful men who have done brave deeds and risked their lives in the doing of their duty. True, they are not all capable or faithful; indeed, I am afraid the average is very low, for the African as a rule is terribly degraded, nor is this surprising considering his disadvantages and the educational effects of the slave trade, and gin at less than five shillings a case. However, during a seven years' residence among Cameroons and Congo people, I have been convinced by their evident possession of ability and what the Americans call "grit," that they are a people with no mean future before them, and that if rightly guided and directed for awhile they will themselves be able to open up and develop the vast resources of their own rich country.

On the Coast Lands and some Rivers and Ports of Mozambique.

By H. E. O'NEILL, H.B.M. Consul, Mozambique.

Map, p. 648.

THE information I now offer to the Royal Geographical Society is mainly based upon the results of six journeys carried out by me on the coast of Mozambique within the past three years, during which I have visited, in many cases more than once, almost every accessible part, whether bay, inlet, or river, between Cape Delgado and Quillimane. But as I have no wish or intention to serve up a mere *réchauffé* of the 'East African Pilot and Sailing Directions,' I shall confine myself to those points that are but imperfectly mentioned or altogether passed over by them, adding such information regarding the coast country and its occupiers as I think will be of interest.

The examination of the coast north of Mozambique was completed in three journeys, and occupied me nearly five months, and that to the southward in an equal number, occupying a little less than three.

The object of these journeys was partly to endeavour to discover the

truth upon the much-debated slave-trade question, and partly to gain an insight into the working of the trade of the coast with the interior, carried on chiefly by British Indian subjects.

In order that the necessary inquiries should be thoroughly and not hastily made, the coast-line to be worked, which extended over a length of 400 miles, was divided into four portions, and carried out in the following journeys:—

1. From Mozambique to Pomba Bay, May–June 1880.
2. From Pomba Bay to Cape Delgado, Oct.–Nov. 1880.
3. Mozambique to Angoche, July 1881.
4. Mozambique to the Moma river, March–April 1882.

Besides these, a short trip was made by land to the Kwibani-Umfussi district, celebrated not long since as a favourite haunt of slave-dealers; and the district of Ibo was revisited in March–April of last year. In all six journeys were accomplished, 43 places visited, and over 1200 miles traversed.

Upon the coast north of Mozambique I find six points, which form regular ports of call for the coasting trader, unmentioned in the ‘Sailing Directions,’ and three of them unmarked in the latest charts. Named in order of their present commercial importance, these are—Simuku, Mkufi, Kisima-julu, Marenje, Nakala, and Kroosi. The first of these may be said to be the outlet of the commerce of the district of the Makua chief Nampwita, and a fair trade is carried on from it in amendoim, calumba, wax, and rubber, all of which I saw being brought in and stored in the houses of the few Indian traders who have stationed themselves there, and by whom this trade is solely conducted. The entrance to the bay appears to be broad and free from reefs; but, though considered a good port by the coasters, at low-water springs a number of shoals are exposed within it, which greatly limit its anchoring space, and will be found, I think, to render it unfit for harbouring larger vessels.

The bar of the river and port of Mkufi, 10 miles north of the Lurio, may always, in temperate weather, be crossed at half-tides by vessels and boats drawing five and six feet of water; and close upon the southern shore, anchorage for such craft can be obtained in two and three fathoms. The village is clean and healthily situated upon elevated ground on the right bank, and provisions and good water may always be procured from it. From this point to the northward the cultivation of amendoim gives place almost altogether to that of gergelim, though, strange to say, without sufficient reason, for in the neighbourhood of Ibo the natives have been induced, within the past few years, to plant the former, and with very successful results.

The scantiest justice is done in our charts to the capacity of Kisima-julu Harbour, five miles south of Cape Melamo, and the main portion of it is entirely unmarked. From the map that accompanies this paper it

will be seen that, after turning sharp to the southward, it opens into a fine basin, giving between four and ten fathoms throughout its whole length. The chief objections to it as a port—doubtless the same that caused it to be overlooked by Owen's surveyors—are the numerous shoals that stud the outer bay, and the narrowness of its entrance. This, however, has not less than three fathoms upon it at low-water springs, and the harbour may be entered in all weathers. It is much frequented by coasters engaged in the timber trade, which constitutes the chief wealth of the adjacent district.

Strictly speaking, Kroosi, situated between the islands of Kroosi and Napenja, is no harbour, for though perfect protection may be gained within the outlying reef, this must be crossed at high water, and coasters invariably ground upon the clean bottom of sand which is found between the extremities of these two islands and the mainland. But the village is a large and populous one, and its inhabitants are chiefly engaged in cutting the timber that forms the only cargo of vessels visiting it. A couple of years ago I walked from Kisima-julu to Chicoma on Conducia Bay, passing for many miles through an extensive tract of country covered with the *macroos* tree, from which this port takes its name. This wood is used in the construction of the rafters of all houses of Europeans on the coast, and is greatly valued for its durability and imperviousness to the ravages of the white ant. Evidence of the extent of this industry I had in abundance, as well as of its primitive working, and saw, for many miles of my walk, the forest cut up in every direction with well-beaten paths, and beams and rafters stacked in numerous places, in readiness to be dragged by hand to the beach.

Of greater geographical interest, however, than all I have mentioned is the harbour of Fernão Veloso, or Mazizima, as it is called by the natives. Fernão Veloso Bay possesses, in addition to its fine outer anchorage, two inner arms, Nihêgêhe ("Belmore Harbour"), and Nakala ("Fernan Veloso river"), the latter of which unquestionably forms one of the finest harbours of the East African coast. Seen from the promontory which, shooting out due west, narrows the entrance to half a mile, this arm extends almost due south to a distance of at least 12 miles, with an apparent mean breadth of about two. Its full extent comes into view when in working into it its irregular outline is seen, the opening up of each headland to the westward revealing a deep bay, the first of which, called Namelala, increases its breadth to not less than four miles. Its eastern shore rises in steep but well-wooded slopes to a height of 100 and 200 feet, with bold promontories, almost cut out for settlement, catching every prevailing breeze over a clear sweep of several miles of water, which, without a trace of mangrove tree or swamp, washes their feet. I believe that nearly 50 miles of perfectly sheltered coast-line is brought, by means of this arm, into water communication with the outer bay, a fact, needless to say, of considerable importance when

judging the conditions that would favour its commercial development, were it an occupied port. Although marked in the charts as "Fernan Veloso river," this branch has none of the evil characteristics of an African river; no powerful current, shifting sands, tortuous and uncertain channels, influenced by the great changes of level of wet and dry seasons. It is rather a land-locked arm of the sea, to the daily ebb and flow of which it is subject, and its surface is swept by regular land and sea breezes, which make it at all times easy for sailing craft to navigate its waters. I was very much struck by its beauty, as well as by the points I have mentioned, and I may perhaps be excused an expression of surprise that a point so favourable for colonisation as Fernão Veloso bay should be permitted by its owners to lie unutilised and abandoned.

Once its advantages appear to have been recognised, and some overgrown and well-nigh hidden stone ruins at the entrance to Nakala mark the remains of the fortress of "Don Miguel," erected just half a century ago, by order of the then Governor-General Paulo de Brito. This was abandoned four years after by his successor "as unhealthy," but, adds the recorder, Francisco Maria Bordalo, "perhaps more with the object of detracting from the memory of the deceased Governor Brito than from the motive alleged."

Whereas north of Mozambique the coast is exceptionally rich in deep bays and secure ports, in turning southward we come, after leaving Mokambo Bay, upon a length of coast remarkable for the absence of good harbours and for the danger of its river bars.

Between Mozambique and Quillimane there are numerous rivers, but few of these are accessible, even to the ordinary coaster, and but one, the Moniga, alias the Quizungu, alias the Tejungu of our charts, can be said to provide a port for ocean vessels. Though most of these rivers are shut up by shallow and dangerous bars, some are of considerable length and have their sources far in the interior.

The country between the Rovuma and the Lurio rivers has been reported by Messrs. Thomson and Maples to be exceptionally dry, uninteresting, and sterile. I did not find the districts in the interior west of Mozambique to be so wanting; yet, looked at from the point of possible agricultural wealth and future colonisation, I do not think it is especially favoured. I am, however, of opinion that the Makua country between the Angoche and Quillimane rivers will be found of all to be the richest in agricultural capabilities and most attractive to the immigrant. The mountain ranges that flank lakes Shirwa and Kilwa (?) to the eastward, and which, from the results of my last interior journey, I cannot but conclude rise to a great altitude, are here brought into closer proximity to the coast by the sharp trend of the latter to the south-west and west-south-west. These catch the moisture which is carried to them from the sea by the prevailing southerly and south-easterly winds, and return it upon their western slopes to the above-mentioned lakes and the Shiré

river; whilst upon the eastern side the drainage is carried out, through well-watered valleys and fertile plains, by the numerous rivers that traverse this district.

Between Quillimane and Angoche there are no less than 20 rivers, which I shall give categorically, as the majority of them are unnamed in our charts.

Commencing from the south we have, between Quillimane and Cape Fitzwilliam, the Makusse, Mumwodo, Likugu (Licougu), Mwabala, Raraka, Mriazi (Mazemba), and Moniga (Quizungu),—seven distinct rivers, five only of which are mentioned in the 'Sailing Directions.' Of these the Likugu and Moniga are the chief. The first, though its sources are in the hilly ranges to the south-east of Lake Shirwa, and it is reported by the natives to be navigable for eight or ten days, is quite inaccessible even to the coasters, who prefer the adjacent Makusse, which they can always enter at high water, and which has a fair anchorage inside.

The Moniga, generally called the Quizungu—the name given by the Makuas only to the island at its mouth formed by the junction of the Mriazi and Moniga—as a port, far surpasses all. It is indeed the only port worthy of the name from Quillimane to Angoche, to both of which it is in many respects superior. It is the natural outlet for the produce of the district between these two points, and its importance is clearly seen by the present Governor of Quillimane, Senhor José d'Almeida d'Avila, by whom its occupation has been strongly urged upon the Portuguese Government.

Continuing eastward, we find the Mlai, Namanwe, and Mlela, passed over as "a small creek" and "two inconsiderable streams." Of these the "Namanwe" is but another mouth of the Mlela, which takes its source some distance in the interior. The junction of the Namanwe with the Mlela forms an island, the Yusi, which name the latter river sometimes goes by, as in the case of the Quizungu island and Moniga river. Working now north-eastward, we come to that remarkable delta which has done duty for sixty years past upon our charts as "the mouths of the Quizungu," and which is in truth three distinct rivers, the Maravoni or Mwebazi, the Molugwi, and the Mwalaka. If native names are to be taken as the correct, the Maravoni must here change its place upon our charts and sailing directions, where it is said to lie N. by E. $\frac{1}{2}$ E. 12 miles from Fogo Island. The river upon that bearing is called the Eredeni, and the Maravoni or Mwebazi is the southern branch of the "Quizungo delta" of our charts.

North of the Eredeni are the Ligonya, Moma, Mwaladi, Laridi, Namakuti, and Natiti, or the southern mouth of the Angoche or Mluli. The Moma river is of these the most important from the view of its harbour, which furnishes a capacious anchorage inside, but the bar of the river is bad, and very few coasters enter it. The Ligonya rises, as I

have said in a previous paper, further in the interior, in the neighbourhood of the Inagu Hills and Namuli Peak.

Here I must notice a contradiction between the statements of the natives of the interior respecting these rivers and those of the coast. Thus, in the interior I was told the Ligonya linked itself with the Mluli or Angoche river, and the Molugwi and Mlela were tributaries of the "Maravoni or Quizungo"; whereas upon the coast we find that each of these rivers has a separate mouth. I do not think the ignorance of the interior natives regarding the outlets, or of the coast natives respecting the sources, surprising. Until a thorough exploration of the country is made, we must of course depend in some degree upon native information, and arrive at the truthful settlement of minor points by slow stages. And I wish to point out here that in a main particular the information given me by natives upon the coast in the vicinity of these rivers corroborates perfectly that gained by me in the interior. The only rivers named by them as extending a considerable distance inland and having their sources in the interior districts are the Mluli, Ligonya, Mlela, Molugwi, and the Likugu, exactly those of which I heard when at Namurola and its neighbourhood, in the interior.

The native names of the Primeira and other islands I will not repeat here. They will all be found in the accompanying map.

Along the whole coast from Missanje Point, the southern extremity of Tunghi or Delgado Bay, to Quillimane river, and at varying distances towards the interior, the inhabitants are Makua. The only other tribe that occupies a locality in proximity to the coast is the Mavia, or Mawia, but my inquiries at Masimbwa and its neighbourhood at the latter end of 1880 satisfy me that there is a distinct belt of Makua between them and the coast.

The coast Makua have, of course, to a certain extent become mixed up with the foreign elements that, perhaps for the past eight centuries, have settled and traded upon this coast. But when we consider that, anterior to Portuguese discovery and invasion, the coast was conquered and settled at many points by the Shirazi Arabs, whose polygamous habits would accelerate that mixture; and that for well-nigh four centuries it has been in the hands of the Portuguese, who have used it as a penal colony, in which criminals have been mostly at large; and that for more than a century past, Banyans, Battias, and other castes of India have settled, for trading purposes, in almost every nook and cranny of the coast, I think it is marvellous that there is not to be found in greater proportion a distinct half-caste race, and that the coast Makua has preserved so notably his aboriginal characteristics. At particular points there is clear evidence of the ancient occupation by strangers; but it is to be traced more in the language than in the colour or features of the natives. At Ibo and Angoche, more especially the latter, the language in use by the natives differs very greatly from the Makua pure, and both

appear to be a compound, in different proportions, of Makua, Arabic (Shirazi), Swahili, Portuguese, Sakalava, and Johanna. The annexed table (see p. 605) of a few words taken at random will best illustrate the extent of this difference.

The almost inappreciable proportion of half-castes in the colony is hardly sufficiently accounted for by the smallness of the inroads which Portuguese colonisation has made upon the coast, and it would seem to point to a natural repugnance and want of affinity between the Makua and the various races of whites that have settled upon it. Amongst themselves they are fruitful enough, and *à propos* of this I may mention that at Mlobwe I was presented to a prolific old lady—of lithe and active appearance, and bearing traces of former beauty—who was said to have given birth to thirty-five children, only eleven of whom, however arrived at maturity.

The only part of the colony in which a distinct element is to be found that at all corresponds to the "Mulatto" and "Quadroon" is in the Zambezia, or Zambesi district, and as this appears to have arisen from legislation which was especially devised to increase and keep pure the European blood of the province—to have, in short, the very opposite effect—it is worthy of notice.

In the early part of last century, Portuguese legislators, anxious to attract to the province colonists of European origin, hit upon the novel and ingenious device of placing there a number of well-dowered women, in the hope that that would form inducement sufficient for emigrants from Portugal to betake themselves thither. The greater part of the rich country that lay upon both banks of the Zambesi, and much of the minerally wealthy district between Sofala and Senna, was parcelled into lots, and offered to Portuguese women for the period of three lives—the succession excluding the male—upon the sole condition that they married Europeans of Portuguese extraction and dwelt upon their holdings. The history of these "Prasos da Coroa," or crown grants, has, however, proved that even such a bait was insufficient to overcome the blight of unpopularity that has settled upon this colony since the golden dreams of its first conquerors were dispelled. But out of the failure there arose a curious condition of things. In the absence of legitimate holders, either in sufficient numbers or of purity of blood, governors-general stretched the original edict, and these tracts fell into the hands of "filhas de Africanos ou Asiaticos," or women with a sprinkling of African or Asiatic blood. In many cases, a number of the original "Prasos" being merged into one, their holders became possessed of small principalities, over which they, or rather their husbands, exercised almost supreme jurisdiction. Some of these maintained small armies of slaves and "colonos," or free natives, set authority at defiance, made war upon each other, and levied black-mail upon all who passed through or settled upon their territory. Others, again, rendered the State considerable service

by supporting with their forces the weakness of the authorities. One Guíão, in the beginning of last century, inflicted severe defeat upon a number of revolted chiefs "with 17,000 of his natives." Not twenty-five years since the district between the Likugu and Antonio rivers was brought into subjection to the Portuguese crown by one João B. de Silva, with his own resources, at the instigation of the then Governor of Quillimane. The Landuns or Zulus of Umzila, who levied regular tribute for many years upon the unfortunate inhabitants of Senna, have been driven back by another, Manuel Antonio de Souza, and the local government thereby released from what was a terrible proof of weakness. These are only a few of the instances I could name.

The abuses attendant upon this powerful feudal system, for it was nothing less, were long since acknowledged insupportable, and in 1836 a law was passed abolishing it, which, with another of 1854, became a dead letter, from want of force to put it into execution. Time, the extinction of the export slave-trade from that district, the Act of Emancipation, and recent legislation, are all gradually breaking up the system, which proved ungovernable, and a fruitful source of trouble in the fairest portion of the province.

The produce of the whole of this line of coast consists chiefly of oil-seeds (amendoim and gergelim), indiarubber, ivory, copra, and wax, and is collected at innumerable points by the agents of the Indian houses of Mozambique and Ibo. One of the most interesting features in the commercial history of the East African coast is the steady growth of trade in the hands of these subjects of British and Portuguese India, and the complete web which has been woven upon it by them.

Attracted from India, more than half a century before Clive laid the foundations of the Eastern British Empire, by an Edict of the Portuguese Viceroy, Conde de Alvor, which gave to a Banyan Company, in 1686, an exclusive monopoly of the trade between Din and Mozambique, the Banyans, strengthened afterwards by the Battias and other Hindu sects, have gradually increased in numbers and in influence, until at this day, despite the loss of all monopolies, they are in sole possession of the trade of the coast. Others there are, wholesale European merchants, at the chief centres of trade; but it is they alone who are to be found in every accessible port and river of the coast, bartering European manufactures for native produce, and thus, by searching out new markets and creating trade, stimulating the industry of the native Makua.

Beyond the trade monopoly, they were formerly granted extensive and peculiar privileges, amongst which one of the most curious was a right to have all cases of crime and dispute occurring amongst themselves settled by their own judges, who generally consisted of Padres chosen from the order of Jesuits. Some say that from this union of commerce and religion much trouble and disorder sprang; others, that the power of the Jesuits and the prosperity of the Banyans alike excited the envy

of the authorities. Both were spoken of in terms of harsh and severe censure. One Governor-general, writing of the Banyans, sweepingly asserts that "they are selfish, false, and cunning, given to lying and usury; that they know not how to keep a contract, and that it is a part of their religious creed to deceive and rob a Christian"; and of the Jesuits, a Secretary of State for Foreign Affairs, writing from Lisbon, states, in a despatch to the Governor-general of the colony, that "His Majesty the King is perfectly aware, and his royal sense of piety has received a severe shock therefrom, that the missionaries have degenerated into a mere association of smugglers," "*em uns meros e illicitos contratadores.*" A drastic measure was therefore taken with their reverences, and in 1759 they were packed off as prisoners to their respective convents in Goa, and the whole of their property in the colony confiscated to the crown. The palace of the Governor-general is at this day the old convent of the Jesuit fathers.

Soon after the Banyans were ordered to return to Mozambique, "because of disorders spread by them on the coast," and in 1777 their monopoly was withdrawn. But these restrictions appear to have had little effect, as for nearly a century past their field of trade has been steadily extending. The feeling of antagonism with which these traders are regarded arises chiefly from the fact that the profits made by them are neither invested in, nor serve any useful purpose to, this country. India is the land of their nativity, and out of it the law of their race does not permit them to permanently settle, or even to carry their women. Residence abroad is, therefore, to them but a temporary sojourn; and the wealth they gain is naturally remitted to the only country custom allows them to call their home.

The greater part of the immense area of country inhabited by the different sections of the Makua race, beyond the coast belt subject to Portuguese jurisdiction is, as I have before said, ruled over by a number of petty independent native chiefs. I trust, however, I have not conveyed the impression that this rule is generally an arbitrary one. The degree of despotism depends greatly upon the personal disposition and strength of character of the chief. Though custom grants him considerable power, it also gives to all the older and chief men of the tribe a voice in the settlement of any question affecting the general weal, and cases of life and death, or of serious disputes, are rarely settled without appeal to them.

I was once the interested spectator of a Lomwe *milando* or trial, in which some of the observances of a civilised court of justice were curiously and unconsciously followed out. In this case the accused had been shooting at and wounding one of his women, suspected by him of infidelity, and it evidently created considerable interest, as the audience was so numerous that the court had left the *baraza*, and was sitting in the open air. It was made plain to me here that the passion for public

speaking, which I have specially noticed in a former paper, was not merely indulged in as an amusement, but that oratory was a recognised power amongst them, and was cultivated as an accomplishment. The accused was represented by a friend, to whose fluency at least I can bear personal testimony. What particularly struck me was the gravity and calm of the whole scene, and the apparent desire to do justice, evidenced by the patient hearing given to all. No expression of dissent stronger than a vigorous shake of the head and negative exclamation in under-tone, or a half-smothered laugh, when it was plain that the speaker was advancing some sophism to bolster up a weak case; and none of assent, beyond the expression *haimai*, "exactly," or "just so," sometimes used ironically, or a low murmur of approval when the orator's argument carried conviction home. All had arranged themselves squatting in favourite fashion, in a wide scattered group about the chief, who, seated on a low stool, made the central figure. But it was easy to see that he was not the sole arbiter in the case, and that the speakers addressed themselves to all the headmen, who, also upon low stools and small cut logs, were in proximity to him. I left before the case terminated, after listening for more than two hours, deeply impressed with the exhibition in it of a politeness and regard for the opinion of others, which we too frequently flatter ourselves are virtues special to civilised life.

With one curious custom of the Coast Makua, the ceremonies observed upon the arrival of the girls of a village at marriageable age, I will conclude this paper. When, in my journey north of Ibo, I landed at Marongo, I found festivities in celebration of this event in full swing and was invited to be a witness of them. The place was crowded with people in full gala costume, for it was an occasion that evidently drew together both young and old of all the adjoining villages. Drums were beating, guns firing, and *pombe* flowing freely, and there was mirth and laughter in abundance, but no drunkenness.

The chief interest centered at a point in the large open square where the damsels in question were grouped. There I saw kneeling, but with heads erect, the forms of some six or eight girls, cleverly draped with cloths which fell to the ground on every side, so that only their attitude and outlines were distinctly visible. Completely encircling them danced, or rather stepped in close file, thirty or forty of the elderly women of the village, clapping their hands and singing in chorus. Outside this guardian ring, in feigned satyric excitement, danced the youthful and robust, elderly and corpulent, aged and infirm of the opposite sex, to the beating of drums, firing of guns, and every conceivable noise. The guardian ring was only broken when one wished to make a present, which the giver was allowed respectfully to place upon the heads of the girls, already well laden when I arrived with cloth, beads, brass wire, and the like. The whole thing appeared to be a public announcement of the arrival of the damsels in the marriage-market, conducted with much mirth, and a profusion, perhaps, of "cakes and ale."

COMPARATIVE TABLE OF MAKUA AND THE DIALECTS OF ANGOICHE AND IBO.

English.	Ki-Ngoji, or Angoiche dialect.	Makua.	Ki-Wiba, or Ibo dialect.
Man	Mlume	Mlobwana	Mwanamlume
Woman	Muka	Mtiana	Mwanatka
Child (not in arms) ..	Msimana	Mwanamane	Kisimana
Brother	Dwiagu	Dada	Nduya
Sister	Mlubwaga	Mrogoraga	Mlubwa
A well	Mlibu	Ehime	Kumrinbu
Rain	Vula	Ebula	Mvula
Lake	Ntada	Nrata	Mtanda
Earth, or clay	Otope	Oroye	Utopye
Sand	Mshaga	Mitaga	Msanga
Dog	Mwanabwa	Mwalabwa	Mbwa
Fowl	Mwanaku	Elaku	Ooku
Goose	Nibata	Marata	Bata
A rat	Pooku	Likuli	Moogu
A head	Eshwa	Muru	Kiswa
The leg	Molu	Medo	Maulu
The nose	Pula	Epula	Inti
A finger	Yala	Ekata	Viala
The ear	Mshilo	Liaru	Sikiro
Road, or path	Duriki	Epiro	Njira
Wind	Pevo	Eteko	Mepo
Cold	Uzizima	Uriria	Uzizima
Bedstead	Olili	Munli	Kinanda
A place	Vahali	Niburu	Mahali
A village	Umudi	Owani	Ukai
The nail of the finger	Likole	Ekata	Omba
A knife	Epsu	Mwalu	Kifu
A trough for beating corn	Mkidu	Eriawo	Nkin lu
An island	Esilwa	Elika	Kisilwa
A star	Mtadoa	Etederi	Nyota
Hair	Nyuli	Karari	Nuri
A <i>hanzu</i> , or native dress	Ajabi	Mlaya	Hanzu
Above	Vadulu	Vazulu	Pajulu
Below	Vati	Vati	Panzi

Adjectives.

Good	Gemali	Orera	Kusitawi
Bad	Othakala	Othakala	Kusagala
Pretty, or beautiful ..	Oshabwaa	Orera	Usitawi, or Wema
Strange, foreign ..	Mledo	Mleda	Mjeni
Many	Eugeni	Nahda	Wengi
Few	Vaditiro	Vakani	Haba
Weak	Woloo	Olozoa	Gavea

Verbs and Phrases.

Bring	Ginke	Givake	—
Go	Ehda	Kawo	Ukah
Come	Tukunu	Bohano	Njonao
I want	Gintaka	Ginatuna	Nukusaga
I don't want	Agebu	Hagintuna	Siebu
I cannot	Aginikidiri	Gimreda	Mdwere
To marry (of the male)	Olola	Otola	Olola
To marry (of the female)	Araliwa	Ataliwa	Kaloriwa

GEOGRAPHICAL NOTES.

Mr. H. M. Stanley.—We learn from telegrams in the daily papers that Mr. Stanley has returned to Europe, after his three years' labours on the Congo. All his geographical friends will rejoice to hear that he is in good health, and that he has succeeded in constructing a practicable road past the cataracts of the Congo to Stanley Pool, and establishing a chain of stations for the promotion of commerce and civilisation along the most difficult part of the river.

Death of Mr. Appel, on the Congo.—By the last mail from the river Congo we hear of the death, on the threshold of his explorations, of Mr. William Appel, a young traveller in the service of the Baptist Missionary Society, who left England in May last full of enthusiasm, and well fitted in many ways for the task he had undertaken (amongst other duties) to perform, namely the survey of Stanley Pool. He had been trained in astronomical observation and mapping by Mr. Coles, and was furnished with a set of instruments by the Society. He died at Banana on the lower Congo, after four days' fever. At the time he was struck down he was making preparations for a survey of the river M'poso, and for a series of hypsometrical observations on the surrounding hills.

The Masai Country.—We have received from Archdeacon Farler, of Magila, East Africa, a valuable original map, drawn by himself from native information, of hitherto unknown routes through the Masai country, from the Pangani to the south-eastern shores of Victoria Nyanza. We hope soon to publish the map, with explanatory text.

Arctic Items.—Mr. T. V. Smith has received a telegram from Sir H. Gore-Booth, dated Hammerfest, Sept. 16th, stating that after parting company with the *Hope*, the *Kara* fell in with the ice on the 12th of August in lat 75° 45' N., long. 58° E., and anchored at Berg Island on the 13th. On the 15th the *Kara* was driven by the ice to Lystina, and on the following day she lost her kedge anchor and cable. She was driven ashore at the Tern Island of Markham by a gale, combined with ice pressure, on the 30th, and on this occasion the boat was lost. Fortunately, by lightening the ship Sir Henry succeeded in getting her off uninjured on the 2nd of September, and on the following day she was free, and able to proceed on her homeward voyage. He adds that they had much snow and bad weather, and the ship was beset all the time. All hands well. Judging from this account, Sir Henry and his party are to be congratulated on their timely escape from a position of considerable danger. According to a telegram received at Copenhagen on the 16th of September, Lieutenant Hovgaard has been less fortunate, since there appears to be some reason to fear that the *Dijmphna* is already

icebound on the coast of Novaya Zemlya. The only reason given, however, is that "the Kara Sea was closed by ice by the middle of August," which is somewhat vague. A previous report, sent from Archangel about the 25th of August, stated that the *Dijmphna* was then trying to get through the Jugor Strait. She was in company with the *Varna*,* *Louise*,† *A. E. Nordenskiöld*,‡ and the schooner *Andrea Diana*. The last-named vessel was expected to return to Tromsø with reports by the 11th of September. Capt. Johannesen, the commander of the *A. E. Nordenskiöld*, has since then been obliged to put back to Norway; he has telegraphed from Vardø on the 16th of September, that he had three times attempted to force a passage through Matotchkin Strait without success and narrowly escaped being frozen in for the winter.—Mr. Melville and the remainder of the survivors of the hapless *Jeannette* expedition have returned to America, and no news of Lieut. Chipp and the third boat has yet been received. With regard to the burning of the search and relief ship *Rodgers* in its winter quarters, it appears that the first published telegram§ stating that it took place on the 1st of January, 1882, was an error. The unfortunate event occurred on the 30th of November, 1881.

International Circumpolar Expeditions.—The Austrian circumpolar observers have had considerable difficulty in taking up the position assigned to them. On her second attempt to reach Jan Mayen the *Pola* sighted the island on the 27th of June, but it was surrounded by a belt of ice from 15 to 20 miles broad, and it was not until the 13th of July that anchorage was at last found between two grounded icebergs in Mary Bay. The buildings and stores of the expedition were landed with all possible despatch, but the *Pola* was three times obliged to stand out to sea to avoid the drifting masses of ice. The station is situated on the so-called isthmus which connects the north and south parts of the island, forming a valley through which runs a glacier stream. Its approximate position is in 71° N. lat., 8° 26' E. long. The valley has been named after Count Wilczek. Regular observations were commenced on the 7th of August. Fogs and rain prevailed from the beginning of July to the middle of August, and the thermometer seldom rose above 3° Celsius, and occasionally fell below freezing-point. Before the *Pola* sailed, an attempt was made to ascend the remarkable volcanic peak of Beerenberg, but after nine hours' hard toil the party were compelled to give it up, having only attained an altitude of 5000 feet. Hot sulphurous steam was issuing from fissures in the sides of the mountain, and extensive layers of lava were found, while some of the party maintain that they heard subterraneous rumblings. At Brielle Tower some ruined huts were seen, and judging from the remains found in them, it is probable that they were built by the unfortunate Dutch colonists who

* See *ante*, p. 549.† *Ibid.*, p. 500.‡ *Ibid.*, p. 499.§ *Ibid.*, p. 376.

attempted to form a whaling settlement on the island in 1630. The *Pola* left Jan Mayen on the 16th of August, and arrived at Leith on the 24th of the same month. Count Wilczek intends to go with her next year to bring the expedition home.

Captain Palander states, in the detailed report of his proceedings, that after landing the Swedish expedition and the depôt of provisions sent by Mr. Oscar Dickson for the relief of Mr. Leigh Smith and his crew, in the event of their coming out by Spitzbergen, he proceeded to Green Harbour, where he picked up the captain and three men belonging to a Norwegian sloop which had been crushed by the ice and sunk in Stor Fiord. The captain of the Danish steamer *Uffo*, which took a party of tourists to Spitzbergen, informed Captain Palander that he had also made several attempts to reach Mossel Bay, but could not get beyond the Norway Islands. On the 5th of August the ice was in the same condition as on the 20th of July, when the Swedish gunboats made a final effort to pass Amsterdam Island before it was decided to land the expedition at Cape Thorsen.* News was received from the United States circumpolar station at Point Barrow in Alaska as late as July 29th. The staff, who had passed the previous winter there, were reported all safe and working well.

A British Annexation near Aden.—A small addition has recently been made to the British Empire in Southern Arabia. The village of Sheikh Othman and its surroundings, amounting in all to about thirty-four square miles, lying inland of the British town of Aden; have been purchased for a few thousands of dollars from the Sultan of Lahej, to provide space for the surplus population of Aden, who find themselves hard pressed for room, chiefly because of the presence of the African Somalis who resort to Aden in increasing numbers for trading purposes.

Recent French Explorations in Tongkin.—The following particulars of an attempt to penetrate to Yunnan by the He-hô or Ly-sien-kiang (the "Rivière Noire" of French geographers), are condensed from the account by M. Villeroi d'Augis, given in No. 11 of the official publication 'Cochin Chine Française: Excursions et Reconnaissances' (Saigon: 1882). The He-hô is the great western affluent of the Song-ka (or 'Rivière Rouge'), and according to the most recent map in Dupuis' work 'L'Ouverture du Fleuve Rouge au Commerce,' 1879, rises in Yunnan at nearly 25° N. lat., and runs through an unexplored region parallel with the Song-ka on its south-western side, finally joining it just below Hong-Hoa, some 30 miles above Hanoi (Kesho). Various other fanciful directions have been given to it, and the little that is known about it is to be found in Dupuis' 'Voyage au Yûn-nân' in Bull. Soc. Géogr.

* See *ante*, p. 549.

(6 sér.) xiv., 1877, p. 54.—M. d'Augis, with M. Marcel Courtin (who died from the hardships of the journey near the Yunnan frontier), made a slight preliminary effort to ascend the Song-ka itself, starting from Hanoi on the 5th September, 1881, but was received above Hung-Hoa with insults and menaces from the Chinese, who were apparently acting under official orders, and was finally compelled by actual attack at Long-Lô to return to Hung-Hoa. Long-Lô does not appear on Dupuis' map, but is evidently only a short distance up the river.—The attempt to reach Yunnan by the He-hô was then made, and successfully carried out as far as Wan-Giom near the frontier, where the death of M. Courtin compelled M. d'Augis to return; but it is evident that the physical obstacles on this river present at least as effectual a bar to traffic as the political opposition on the Song-ka. As far as the rapid of Phô-Bô, the river is of easy navigation and gentle aspect, but above that point it flows with but slight interruptions between perpendicular granite walls often frightfully overhanging, and looking as if a gigantic axe had cleft the primitive rock to make a passage 900 feet deep. These walls are of equal height and identical geological formation, with large strata of carbonate of iron exactly reproduced on each side. In the rainy season, the river rises for nearly 23 feet, and the enormous pent up body of water, when storm driven, undermines the base of its granite prison to such an extent that huge masses of rock are precipitated into the bed of the river, forming enormous rapids which alter the level and render navigation perilous even for native canoes. These rapids are constantly increasing; M. d'Augis counted fifty-four of them up to Wan-Giom, and found at Thác-Keu a complete bar in the shape of rocks some 23 feet high, a perfect chaos rendering all further canoe navigation impossible. He specially names Thác-Bé, Thác-Bómoi, and Thác-Tho-Ba as the worst rapids,—Thác-Bómoi being the most terrible, as he found to his cost, being twice wrecked on it, on the second occasion losing all but his papers and mineral specimens. Ill from fever and poisoned water, he succeeded, however, in descending the river to Hanoi, which he reached on the 24th December last.—He found various indications of mineral wealth in the volcanic rocks examined, such as iron, marble, malachite, copper, and in one place pockets of mercury; and his observations warrant the idea of a rich flora and fauna existing in North-western Tongkin.—The country is inhabited by Muôngs, who submit impatiently to the rule of a chief habitually residing at Son-Tai and completely dependent on the court of Hué, the capital of Annam. Being hill-men, they are stronger and more courageous than the plain-dwelling Tongkinese, and of more vigorous development than the Annamites; they are mostly unprepossessing and apparently of brachycephalic type, very prolific, like the Chinese, and industrious, practising the arts of weaving and dyeing. The (36) characters of their writing are syllabic, unlike those of all others in the Far East, which are ideo-

graphic, and their writing is from left to right; they have nine numerals, but no zero. M. d'Augis considers that these linguistic peculiarities should throw a new light upon Aryan migrations, and remarks upon the peculiar conservation by the Muôngs of their tribal autonomy and customs under constant pressure of exterior influences. He describes a singular funeral custom among them: the corpse is fastened up in a tree trunk and deposited for three years in the hut of the nearest relation of the deceased, being at the end of that time buried in the earth and covered with a tumulus. Rich Muôngs sometimes accompany the latter ceremony by the sacrifice of an ox every day for three weeks.

A Journey in North Sze-chuen.—A very interesting series of letters by Mr. E. H. Parker, descriptive of his recent travels in Northern Sze-chuen, is appearing in the *China Review*. The letters do not contain much important geographical matter, but they are written in a very popular style and convey a good deal of information regarding the products of the country east of Cheng-tu-fu, especially touching the silk, of which the best qualities come from Shun-king and Pao-ning, two towns visited by Mr. Parker, and which forms an important export of Sze-chuen. At the first inn where Mr. Parker came across the yellow Sze-chuen silk, he remarks that there were also large numbers of coolies conveying loads of one thousand *taels* in silver to Mien-chou for purchase of silk. These loads are placed in the innkeeper's chest at night and somebody sleeps on the top, the innkeeper being responsible for losses which take place in his hotel, which, however, may be more fitly compared to a cattle-pen. In a case where Mr. Parker was robbed himself the innkeeper was at once made to pay the value of the missing articles. But, he adds, there is on the whole great security for property in this province, and it is doubtful if anywhere else in the world a simple unarmed coolie could travel 500 miles with 300*l.* attached temptingly to the end of his pole. Mr. Parker's letters remind us in style of 'Travels and Researches in Western China,' by Mr. Baber, who must have travelled in the earlier part of his journey over much of the same ground as Mr. Parker.

Russian Explorations in Sakhalin (Saghalien) Island.—M. Poliakov, the traveller sent out by the Russian Geographical Society to explore the island of Sakhalin, has recently returned to St. Petersburg.* Between the date of his landing, at the end of June 1881, and the spring of the present year he explored large tracts of the hitherto almost, or quite unknown interior. His principal journeys were in the so-called Alexandrofka valley, and along the course of the Tim or Tym river. The most important practical result of the expedition is the discovery of the fact that the Tym is navigable for vessels of sixteen feet

* Vide 'Proceedings,' vol. iv. p. 109.

draught for a distance of five versts. This river forms the only accessible harbour on the whole coast of Sakhalin with the exception of Kuegda Bay, which is situated in an entirely unpopulated and barren district on the north side of the island. M. Poliakof states that the flora and fauna almost everywhere resembled those of North Siberia. In many places he found traces of ancient colonies, with stone implements similar to those discovered in European Russia. Some articles made of obsidian indicate a pre-historic communication with Kamchatka or some of the Pacific islands, and judging by the circular excavations which were found, the aborigines of Sakhalin appear, like the Kamchadals, to have dwelt in huts partly sunk in the earth. The kitchen-middens contained bones of bears and other animals; and amongst other remains found were very heavy "net-weights" for sinking fishing-nets, showing that the nets formerly used must have been very large.

The Mean Sea-level at Bombay and Madras.—General J. T. Walker, C.B., Surveyor-General of India, has lately devoted much care to the investigation of a remarkable anomaly apparent on the conclusion of the spirit-levelling operations executed in connection with the Indian tidal observations, and carried across the peninsula from Bombay to Madras. This consisted in the deduction that mean sea-level is about three feet higher at Madras than Bombay. That there are variations in the general level of the ocean-surface at different places, when referred, say, to the earth's centre, is possible enough when the attractive influences of mountains are taken into consideration. But the Surveyor-General points out that they would not be appreciable because they could not be measured by instrumental means, as the causes by which they are produced must equally affect both the spirit-levels of the instruments and the water-levels of the ocean, when both are subjected alike to the same influences. After patient investigation General Walker comes to the conclusion that the cause is to be found in an accumulation of minute errors in the course of the levelling operations, due to the fact that when the general direction of the lines of levels is towards the sun or opposite to it the observer gets a side view of the bubble, refracted obliquely through the thickness of the glass tube, and is thus inclined to regard the outer edge of the *rim* of the bubble at the end nearer the light and the inner edge of the rim at the other end, for the bubble itself. Consequently there is a tendency to assume the instrument to be level when in reality the end towards the light is depressed. This personal error, in levelling during the hours of sunrise and midday (the working hours in India), would produce a maximum effect on lines running south-east and north-west, the result being to make the southern stations appear the higher. Now this has been found to occur in a greater or less degree in all the lines connecting tidal stations, and all the discrepancies agree in raising the southern points relatively to the northern. The

conclusion that the difference in height between Madras and Bombay is due to this cause is clinched by the fact that a single error of the kind described when measured and multiplied by the number of stations at which it would occur between Madras and Bombay (which meridionally are 400 miles apart) would produce about three feet, the very discrepancy in question.

Inspector Krarup Smith.—We are informed by a correspondent of the death of Mr. Krarup Smith, who has, since 1867, been Inspector of the Northern Districts in Danish Greenland. During the past winter he suffered from terrible sleeplessness, and he expired somewhat suddenly on the 28th of May, aged 49. Every traveller who has passed any time at Godhavn during the last fifteen years has spoken of the kindness and attention of Mr. Smith and his wife. He rendered important services to various arctic expeditions, and freely placed his house and resources at the disposal of scientific workers. Nares, Markham, Hayes, Pavy, Whymper, Nordenskiöld, Steenstrup, and many others, of various nationalities, have experienced their hospitality or received their assistance. Although Inspector Smith was not of a robust constitution, he travelled extensively by boat and by sledge in summer and winter throughout the Inspectorate, which extends over more than five degrees of latitude, and took much concern in the welfare of the natives, who sustain a real loss by his lamented death.

Explorations in the interior of British Guiana.—Mr. H. Whitely, a gentleman who has devoted many years to natural history pursuits in the interior of British Guiana, has just returned to England. He resided for upwards of a year among the Indians in the neighbourhood of the famous Mount Roraima, of which in its many aspects he made a numerous series of drawings. His excursions in this direction extended beyond the Venezuelan frontier.

Obituary.

Sir Woodbine Parish, K.C.H., F.R.S.—One of the oldest and most respected members of our Society has passed away during the past month. In his quiet home at St. Leonard's-on-Sea, where he spent the latter years of his long and useful life, surrounded by his books, maps, and many reminiscences of his travels, on the 16th August last, died Sir Woodbine Parish, British Chargé d'Affaires at Buenos Ayres in the early years of South American independence, and in his time a zealous cultivator and promoter of geographical studies.

Sir Woodbine was born in 1796, and was educated at Eton at the time when Dr. Keats ruled the college and thrashed the boys all round because the offenders in some flagrant act of schoolboyish rebellion refused to give themselves up to justice. Our late member began his diplomatic career early in life. He was present at the restoration of the King of Naples, and travelling home with despatches, crossed the

field of Waterloo shortly after the battle. He accompanied Lord Castlereagh as Private Secretary to Paris during its occupation by the Allies in 1815, and many were his reminiscences of those eventful times. The treaty of peace signed by all the crowned heads of Europe was written by him. In 1817 he received a clerkship at the Foreign Office; the following year he accompanied Lord Castlereagh to the Conferences at Aix-la-Chapelle, and in 1821 to Hanover for the coronation of King George IV. After having been employed diplomatically in Albania, he was sent in 1823 by Mr. Canning as Commissioner and Consul-General to Buenos Ayres. As plenipotentiary to the provinces of the Rio de la Plata he negotiated the first treaty recognising the independence of the new States of South America. Upon the establishment of diplomatic relations in 1825 he was made chargé-d'affaires at Buenos Ayres. In October 1828 he obtained the ratification by the Argentine Republic of the preliminaries of peace with Brazil, establishing the independence of the State of Uruguay under British mediation. Before leaving South America he concluded a convention securing full indemnities to British sufferers from the Brazilian war, and he also obtained the release from Paraguay of all the British and other foreigners who had been for many years forcibly detained there by Dr. Francia, receiving the thanks of the French and other governments. Returning to England in 1832, he brought with him fossil specimens of the megatherium (now in the College of Surgeons), the glyptodon, and other strange species of extinct animals, which had been disinterred from the post-tertiary gravels of the basin of the Plata. The work he subsequently published (in 1839 and 1852) under the title 'Buenos Ayres and the Provinces of the Rio de la Plata,' received a very high encomium from no less an authority than Baron Humboldt, and has continued to the present day to be a standard book of reference on questions relating to those countries. Sir Woodbine Parish was created a Knight Commander of the Royal Hanoverian or Guelph Order in 1832, and was knighted in March 1837.

He was elected a Fellow of the Royal Society in 1824, and of the Royal Geographical Society in 1833. As Vice-President of our Society he supported Sir Roderick Murchison during his second term of office in the Presidential chair, and took an active part in its affairs, serving almost continuously as Vice-President or Member of Council from 1833 to 1853. For many years he was the referee of the administration on all subjects relating to South America, and contributed many papers to the early volumes (vols. iii. to vi.) of the Society's Journal, his last communication being a translation made by himself from the Spanish of Don Guillermo Cox's important journey across the Chilian Andes to Lake Nahuel-huapi and the Rio Negro. He also served as Vice-President of the Geological Society.

Sir Woodbine Parish belonged to that high type of Englishmen who speak but little of themselves and perform much. Rarely are such varied attainments as he possessed to be seen united in one person. To the distinguished services he rendered his country in the eventful years of his early life, when England had busy dealings with every nation in Europe, brief allusion has been made. In his later years spent at St. Leonard's-on-Sea, he endeared himself to many who esteemed it a privilege to take counsel with one who knew so much, judged so wisely, and whose principles of action were so truly Christianlike.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

SOUTHAMPTON MEETING, 1882.

The meeting of the British Association for the Advancement of Science was held this year at Southampton, from the 23rd to the 30th of August. The Geographical Section was organised as follows:—

PRESIDENT.—Sir R. Temple, Bart., G.C.S.I.

VICE-PRESIDENTS.—H. W. Bates, F.R.S.; Major-General A. C. Cooke, R.E., C.B.; Sir F. J. Evans, K.C.B., F.R.S.; Lieut.-Colonel H. H. Godwin-Austen, F.R.S.; Sir Joseph D. Hooker, K.C.S.I., C.B.; Admiral Sir Erasmus Ommanney, C.B., F.R.S.; Colonel Sir Oliver St. John, R.E., K.C.S.I.

SECRETARIES.—E. G. Ravenstein; E. C. Rye (*Recorder*).

The President's Address to the Section.—The subject of Sir Richard Temple's Address was "The Central Plateau of Asia." After some preliminary remarks in which he observed that this area was one of the most wonderful on the surface of the earth, containing nearly 3,000,000 English square miles, and equalling three-fourths of Europe, he proceeded as follows:—1. In shape the plateau is somewhat of an irregular rhomboid, completely enclosed by six grand ranges of mountains, namely the Himalayas looking south towards India, the Pamir looking west towards Central Asia, the Altai looking north towards Siberia, the Yablonoi looking north-east towards Eastern Siberia, the Yun-ling and the Inshan (inclusive of the Khingan), looking towards China. These several ranges preserve generally a considerable altitude varying from 6000 to 25,000 feet above sea-level, and reaching in the Himalayas to more than 29,000 feet. But as a great part of these several ranges is as yet unsurveyed by trigonometry, it is possible that still greater heights may be discovered, and that "excelsior" may be the proud answer rendered by the everlasting hills to human investigation. . . . Such being the outer barriers of our plateau, there are within it two great ranges mainly parallel and running from west to east, namely the Kuen-lun and the Thian-Shan. While the Himalayas form the southern flank of the great Tibetan upland, the Kuen-lun constitutes the northern. The modicum of knowledge possessed by us regarding the Kuen-lun, a most important factor in the geography of our plateau, is largely due to the praiseworthy travels of the Russian Prejevalsky. This range may be said in a certain sense to overlook the Tarim basin ending in Lake Lob, though the mountains are actually distant more than a hundred miles from that lake. It forms the southern boundary of the Tarim basin, which contains some of the few beautiful tracts in our plateau. If there be such a thing as a backbone to these regions, or anything like a dorsal ridge, it consists of the Kuen-lun. The Thian-Shan starts from the Pamir, and runs westward for full 1500 miles, till it joins with some of its spurs the uplands of Mongolia proper, or touches with others the dreary desert of Gobi. As the Kuen-lun forms the southern boundary of the Tarim basin, so the Thian Shan constitutes the northern. Connected with the north-western part of the Himalayas is another range which some regard as an offshoot, but which others treat separately under the name of Karakoram. Together with the Himalayas it joins the Pamir. Thus three of the greatest mountain ranges in Asia converge upon the Pamir, or according to some are there interlaced; namely the Himalayas, the Kuen-lun, and the Thian-Shan; to which perhaps two others might be added, namely the Karakoram just mentioned and the Altai. But it may be more accu-

rately said that the outer border of our plateau north of the Pamir is formed by the terminal spurs of the Thian-Shan. It is to be remembered also that the Indian Caucasus—which does not concern our plateau directly enough to fall within this address—probably joins the Pamir. In general terms, the convergence of mountain ranges on the Pamir renders it geographically the most important position in Asia. The uninstructed Asiatics have evinced a hazy admiration of its grandeur by calling it “the roof of the world.” The comparatively instructed Europeans have revered it as the source of the classic Oxus and as fraught with political considerations. . . .

2. The vast surface of our plateau, though almost uninterruptedly environed by its rocky walls, presents an extraordinary series of elevations and depressions. In the heart of the plateau there is the depression known to geographers as the Western Gobi, sometimes called the Tarim basin. Within this there is the Lob lake or Lob Nor, truly an inland sea into which the waters of several rivers ultimately flow, finding no vent towards the ocean. The total length of the Tarim river with its affluents debouching into Lob Nor, cannot be less than 800 miles. This curious and interesting lake is not more than 2000 feet above sea-level, and forms almost the lowest dip in our plateau. It is like the bottom of a vast platter, or the centre in the hollow of a mighty hand. Around this depression there are on all sides uplands of various heights like gradations in the Asiatic terrace terminating in the intermediate ranges, or in the outer circumvallation of mountains already described. On the east of it there is the tract called Eastern Gobi, partly desert, and Mongolia, averaging 4000 feet above sea-level: on the north the Altai uplands, exceeding 5000 feet. On the west the Pamir rises abruptly, exceeding 13,000 feet; on the south Tibet, with equal abruptness, having an average altitude of 15,000 feet above sea-level, thus being the loftiest expanse in the world; and on the south-east the tract around the Kuku Nor lake, 10,000 feet. Further, there is a detached depression known as the Zungarian strait, extending to the northern confine of our plateau between the Thian-Shan and the Altai ranges. This strait, hardly exceeding 2000 feet above sea-level, is as low as, perhaps even lower than, any part of our plateau, and is very near breaking its continuity, which may be considered as being just saved by the comparatively humble altitude above mentioned. The depression is geographically important as forming the only broad pass between our plateau and the world without. It runs from Mongolia, the most important tract within our plateau, to Siberia outside. Great value was, in early times, attached by the Chinese to it, as being the only natural highway on a large scale between Northern and Central Asia. . . . On most of its sides our plateau is extraordinarily inaccessible, the passes being steep in the extreme, and culminating in ridges 18,000 to 20,000 feet above sea-level. Towards Siberia the Altai passes are easier, and on the north-east between Mongolia and China there are several passes that have witnessed the historic outpourings of the Mongol hordes, and which are ominously remembered by the Chinese as the openings through which their invaders rushed like the great river in flood, or the landslip from the mountain side, or the avalanche sweeping along the boulders and débris to the destruction of the valleys beneath. The great desert of Eastern Gobi occupies the eastern portion of our plateau. With its accumulating forces of sand and powdered earth it has a tendency to encroach, and is regarded by man with a vague awe. Its present extent is enormous, being not less than half a million of square miles. Nor does it exist alone within our plateau, for between the Tarim basin and the Kuen-lun spurs there is a lesser desert called Takla-makan with 100,000 square miles of area. It may probably be found that these two deserts join or are otherwise connected.

3. We have noted that while the prevailing characteristics of our plateau are

wildness, ruggedness, or desolation; yet within it are the sources of several great rivers which sustain the most teeming peoples on the face of the earth. The monarch as it were of all these noble waters is the Yang-tse-kiang. Though its head streams have been but imperfectly explored, yet its true source is known to be in the Kuen-lun mountains already mentioned. After quitting our plateau and passing out of its prison-house in the mountains through natural gates of the utmost magnificence, it permeates the most thickly-peopled provinces of China—provinces inhabited by about 120 millions of souls. It sustains the life of this enormous population by supplying the necessary moisture and by affording the means of irrigation and of water-traffic. No river has ever in ancient or modern times played so important a part in the increase of the human race as the Yang-tse-kiang. Its supply of water is immense and unfailing, and this most essential characteristic is caused by its connection with the snow-clad and ice-bound regions of our plateau, within which it has a course of 700 miles before entering China proper. Amidst the same Kuen-lun range, the Hoang-ho rises, from unexplored springs, which the Chinese figure to themselves as "the starry sea." After bursting through several watersheds, making wondrous bends from its main direction near the base of our plateau, and changing its course more than once to the confusion of comparative geography, it traverses Northern China and confers agricultural prosperity on some 70,000,000 of souls. It also has a course of some 400 miles within our plateau, in consequence of which its water supply is perennially snow-fed. Again, the Irawadi and the Mekhong, the former watering Burma and the latter watering Cambodia, rise in the offshoots of the Kuen-lun. That region, then, in respect of the parentage of important rivers stands in the first rank. This beneficent circumstance arises from the direction of subsidiary ranges which admit to this part of our plateau some of the moisture-laden breezes from the Pacific Ocean. Similarly the two Indian rivers, the Brahmaputra, and the Indus with its affluent the Satlej, have their origin at a great distance within our plateau, and their water-supply is indefinitely augmented in consequence. Notwithstanding the vast volume of their waters, these rivers play an economic part which, though great, is much less than that of the main Chinese rivers. The Brahmaputra above its junction with the Megna cannot be said to sustain more than 15,000,000 of people; and the Indus, together with the Satlej, may support 12,000,000. The Ganges and Jamna, issuing from masses of snow on the southern scarp of our plateau, sustain before their junction at Allahabad a population of 30,000,000—quite irrespective of the deltaic population of the lower Ganges, for whom moisture is supplied from other sources. Of these Indian rivers the waters, perpetually snow-fed, are largely drawn away for canals of irrigation on a grand scale. Taken all in all, despite defects, the Ganges Canal is the most imposing example of hydraulic engineering that has yet been seen. From the glaciers of the Pamir and the western terminus of the Thian-Shan there spring the head streams of the Oxus, the Jaxartes, and other rivers, ending in the inland sea of Aral. To these, in Persian phrase, the epithet of "gold-scatterer" or "wealth-dispenser" is felicitously applied by the natives. Of the rivers rising in the northern section of our plateau, the Amur has possibilities of which the future may see the development. But the great rivers of Siberia, such as the Obi, the Yenisei, and the Lena, though flowing through rich soils and affording marvellous facilities for several systems of inland navigation to be connected with each other, yet have their long estuaries in the permanently frost-bound lands of the Tundra, and their mouths in the arctic waters frozen during most months of the year. Therefore they can never, in economic importance, vie with the rivers above mentioned, which flow into the Pacific and Indian Oceans.

4. The lacustrine system, though not comparable to that of North America or of

Central Africa, and not approaching in beauty or interest that of Southern Europe is yet very considerable. It is not, however, the only one in Asia, and from it must be excluded the three great Siberian lakes of Issyk-kul, of Baikal, and of Balkash, which, though connected with our plateau, are beyond its actual limits. Exclusive of these, however, the lakes, great and small, within our plateau, are extraordinarily numerous. Not less than a hundred of them may be counted on the maps of this region. Of these lakes, however, some are insignificant, being little more than saline swamps. Others, again, as the Pangong, though romantically beautiful—reposing at an altitude equal to that of the highest European mountains, and reflecting the perennial snow of surrounding peaks—do not illustrate specially any geographical problem, nor produce any economic result. But some may be selected as having a scientific interest irrespective of beauty or of strangeness. The Lake Victoria, discovered by Wood in 1838, rests in the heart of the Pamir, already mentioned, at an elevation of 14,000 feet above sea-level. It is frozen over during the greater part of the year, and lies with a glistening and polished surface in the midst of a snow-whitened waste. In that state it powerfully affects the imagination of the spectator who reaches it as the final goal, after a protracted and toilsome ascent from the barren or deserted plains of Ariana. It is the source of the Oxus, and is near the point of contact between the British and the Russian political systems in Asia. In the sharpest contrast to the highly-placed Pamir lake is the lowly Lake Lob, already mentioned. Shallow water, sedgy morass, dreary sands, parched forests, the monotony of desolation, are reported to be its characteristics. It apparently consists of the dregs of an inland sea that is mostly dried up, and is, as it were, kept alive only by the Tarim river, which has its sources in the everlasting snows of the Pamir. Despite the proximity of saline tracts, the lake has fresh water. Near it is a great desert, of which the soil, though now arid and friable, owing to the gradual desiccation, was once more or less productive, and where a population has probably become extinct or has disappeared by migration. The Pamir then is a water-parting for two inland seas, one the Aral, beyond our plateau, the other Lob Nor within it—both saved from speedy desiccation only by the influx of rivers from the snow-line. Again in contrast is the Kuku Nor, a sheet of water 10,000 feet above sea-level, in the eastern section of the Kuen-lun mountains, near the source of the Hoang-ho. Its waters, profound and saline, have a dark azure hue, which is compared by the natives to that of the exquisite silks in China. It is in the Tangut region, mentioned by Marco Polo in his Itinerary. In respect to the lakes in this region, and especially the morasses of Tsaidam, there are geological speculations as to another Asiatic Mediterranean (besides that already mentioned), long since dried up, whereof there are a few widely scattered remnants, among which the Kuku Nor is one. Lastly a word of passing notice may be devoted to two among the Tibetan lakes, that of Tengri, near Lhasa, on the shores of which stands a venerated Buddhist convent, and the Bul-tso, from which have been obtained quantities of the best borax.

5. The north-eastern part of our plateau was, during remote ages beyond the ken of history, the home of hardy and aggressive Tartars. These Tartar races, dwelling among the uplands in the lee of the mountains, used for many centuries to emerge and harry the fertile Chinese plains lying between the mountains and the Pacific Ocean. It was to ward off these incursions that the Great Wall was constructed, winding like a vast serpent of stone along the ridges of mountains for 2000 miles from the Pacific coast to the Siberian confines. The cost and labour expended on this amazing work attest the dread with which the Tartar highlanders had inspired the Chinese lowlanders. Some centuries after the building of the Wall, the most warlike among the Tartar tribes, in the council of their national assembly, acclaimed Temujin as their king, in the year 1206 A.D. He took a title which is translated by Euro-

peans as Chinghiz Khan, a title which for two centuries or more was the best known name in the whole world. At the head of his Tartar adherents, he first subdued the other kindred tribes of our plateau. Then he organised and disciplined the whole Tartar manhood into an army of horsemen. This is the most wonderful instance of military mobilisation known to history ancient or modern. Its results too were equally appalling. In mediæval times the marches of the Arabs and the Saracens, in modern times the expeditions of Napoleon, have dazzled Asia or Europe. These were hardly, however, equal to the distant conquests of Alexander the Great in ancient times. But even the wars of Alexander were perhaps surpassed by the ravages of Chinghiz Khan and the Tartars of our plateau. The countries of China, India, Afghanistan, Bactria, Persia, the Aral-Caspian basin, Siberia, Asia Minor, Russia, were overrun within a hundred years by Chinghiz Khan, his lieutenants, and his immediate descendants. Thus, through the hordes of our plateau, there was established a dominion stretching from Cape Comorin, near the equator, to the Arctic Ocean, and from the Pacific shores to the banks of the Vistula in Poland. The latest historian of the Mongols considers that nothing but the unexpected death of the Tartar sovereign, and the political combinations arising in consequence within this very plateau of ours, prevented the Tartar invasion from spreading even to Western Europe. Though it is often held that these terrific events have been overruled by Providence for the progress of mankind, still at the time they caused what Gibbon truly calls a shipwreck of nations. Notwithstanding this, the Tartars won, in a certain sense, an unparalleled success, which is attributable to the geographical circumstances of our plateau. The influence of the precipices, the forests, the prairies, the wild sports, in forming the national character is so obvious that it need not be specified. We readily understand how the sturdy mountaineer, the daring hunter, the practised archer, becomes the able soldier. In Mongolia, however, the local speciality was this, that the practically boundless extent of the pasturage and the nutritious richness of its quality, induced the people to maintain countless horses, cows, buffaloes, sheep, goats, and camels, neglecting the tillage of the soil, never building houses, but living in tents made of warm felt, accumulating a certain sort of rude wealth, still roving and roaming about at some seasons incessantly from one encampment or one grazing-ground to another, dragging with them their families and their effects by means of the pack animals and the roomy waggons drawn by many oxen yoked abreast. Thus was a truly nomadic existence practised on the largest scale ever known. Mongol armies, better drilled, armed, accoutred, and equipped than any forces then known in the civilised world, would emerge from our plateau into the inhabited plains around, and would observe houses and towns for the first time. It is even alleged that some of them had never seen cultivated crops before. In this state of existence the temptations to depredation of all sorts were excessive, and the danger from the climate, the savagery of nature, and the wild beasts, was always imminent. Consequently, the Mongols were obliged to hold themselves together by the cohesion of families, clans, and tribes. Thus by the force of circumstances a social organisation was established which proved the foundation of a military discipline suitable to the genius of the people, almost self-acting, and unailing even in the remotest expeditions. The horses, too, upon which the Mongol warriors mainly depended, naturally fell into the training; being always turned out to graze in herds, they habitually kept together, and the field manœuvre fixed habits which had been already acquired. It used to be remarked that a line of Mongol cavalry was like a rope or a chain, perfectly flexible but never parted. The Mongolian food included little of cereals or vegetables, but consisted mainly of cheese and meat. For stimulating drink there was the fermented mare's milk. The name *koumis* or prepared milk, apparently much esteemed medicinally now-a-days, is a Mongolian word.

Manifestly, men thus nurtured could live in the saddle night and day, carrying with them their sustenance in the smallest compass, and scarcely halting to eat or drink. Thus the hardihood evinced on protracted marches, which would otherwise be incredible, can be accounted for. It is probable that this diet while sustaining vivacity produced also a violence of disposition. Certainly, ruthlessness, cruelty, indifference to suffering, characterised the Mongols and marred the effect of their grand qualities. Massacres, holocausts, conflagrations, marked their warlike operations. Even famines and epidemics have hardly done more for depopulation than the Mongol conquests. A Mongolian chief would say that the keenest enjoyment in life was to stamp upon a beaten enemy, to seize his family, and despoil his encampment.

It is not the purpose of this address to describe the policy of the Mongols or the institutions which they founded in conquered countries. A few salient points only have been indicated in reference to the geography of our plateau. It is here, near what is now known as the upper region of the Amur, that the Onon, the Orkhon, and the Kerulen, classic streams in Mongol story, take their source. Here is the site of Kara Koron, the emperor's head-quarter encampment. Here the Kurultai assemblies were held to decide the fate of nationalities. Here were the camps, the Urts, and Urdus, rude names at first unpronounceable in the civilised world, but soon to become terribly familiar. Here were the hordes mustered under their banners, each standard having its distinctive colour, the supreme ensign being, however, the yak's tail raised aloft. Hither, also, the corpse of Chinghiz Khan was borne in a cumbersome catafalque, dragged through the deep loam by oxen yoked twenty abreast, while his henchmen chanted a dirge which was a pathetic effusion from the heart of a valiant nation, and was full of poetic images drawn from the Mongolian surroundings.

6. Though our plateau has possessed, and still possesses, some patches of fine cultivation, such as those in the Upper Tarim basin, near Yarkand and Kashgar, and some near Lhasa in Tibet, still it has comparatively but little of agriculture, of trade, or of industry. Nevertheless it has many natural resources of value and interest, while its pastoral resources have proved astonishing. Its breed of horses, though by no means the finest, has yet been quite the largest ever known. These horses have never displayed the beauty of the Arabian or the size of the Turkoman breed. They are middle-sized, and do not attain the speed of thoroughbreds. But in nimbleness amidst rugged ground, in endurance over lengthened distances, and in preserving their condition with scanty nourishment, they are unrivalled. Their numbers too may well exercise the imagination of modern breeders. For many years the Tartar emperors maintained in the field at least 500,000 cavalry, for which the horses were drawn chiefly from our plateau. This enormous cavalry force was engaged in fighting over an area of many thousand miles in length and breadth, during which operations much desperate resistance was encountered. It was occupied in steep ascents and descents, in traversing deserts, in crossing frozen lakes, in swimming rapid rivers. How vastly numerous then must have been the casualties among the horses, and how immense the breeding studs! The pasturage too was so potent in nutritive qualities that ordinarily there was risk of animals suffering from repletion, and emaciated creatures rapidly gained flesh and strength. In other respects too the fauna are noteworthy—the sheep and goats, with wool or down of the softest texture—the buffalo herds and the yaks inured to the sharpest cold—the gazelles careering in thousands—the untameable camel of the desert having a speed and agility unknown in other species—the wild asses and the white wolves—the waterfowl at times like clouds darkening the air.

7. The field offered by our plateau for scientific research will be apparent from

even a cursory consideration of the stage to which our knowledge has reached. For some time it has been the sphere chosen by many among the most skilful, enduring, and intrepid travellers of Europe. The journeys of the Russian Prejevalsky in the Tarim basin and Mongolia, of Potanin and Rafailoff in the same region, of Malussovski near Koko, of the French missionaries Gabet and Huc in Mongolia, of the Bishop Desgodins in Tibet, of the German Schlagintweit in Turkistan, of the Englishmen Forsyth, Trotter, Johnson, Shaw, Hayward, in the Tarim basin, of Wood in the Pamir, of Ney Elias in Mongolia, of Delmar Morgan in Kulja, of Bogle and Manning in Tibet, while teaching us very much, have yet left our minds dazed with a sense of what remains to be learnt. Even the trigonometrical determination of the Himalayan summits by the English Surveyors General, namely Everest, Waugh, and Walker, the researches of Basevi, Stoliczka, Godwin-Austen, Thomson, Biddulph, in the same quarter, and the Siberian surveys by the Russians among the Altai and Tien-Shan mountains, have brought us only to the verge of half-discovered or undiscovered countries. The greatest unexplored region in all Asia, namely the Kuen-lun range, lies in the very heart of our plateau. It is remarkable too that if the principal geographical problems awaiting solution in Asia be specified—such as the true and ultimate sources of the Hoang-ho, the Irawadi, the Salwin, the Mekhong, the relation of the San-po with the Brahmaputra, the connecting links between the Kuen-lun and the Chinese mountain chains, they will be found to concern our plateau. At a few points only has our plateau been penetrated by geological surveys, namely, in some parts of the Altai and at the western end of the Tien-Shan; and these surveys are Russian. . . . To meteorologists many of the natural phenomena must prove highly interesting—the causation of the wondrous dryness, the effects produced on animal comfort by the rarefaction of the air, the clouds of salt particles driven along by furious gusts and filling the atmosphere, the fires in the parched vegetation of the desert, the spontaneous ignition of coal-beds, the caves emitting sulphurous gases, the rocky girdle of syenite bounding the Gobi desert, the gradual contraction of the glaciers, the ordinarily rainless zones sometimes invaded by rain-storms with a downpour like that of the tropics.

8. Our plateau is now under one imperial jurisdiction, and offers many problems for social inquirers. It belongs entirely to the Chinese empire with the exception of one small tract where the Russian authorities have crossed the mountain border. The geographical features for the most part favour national defence and territorial consolidation. The old Chinese Wall is still suitable to the political geography of to-day. In the Zungarian strait, however, in the Ili valley near Kulja, perhaps, also, in the line of the Black Irtysh, near Zaisan, the Chinese empire, in its contact with Russia, has weak points strategically, or chinks in its armour. Though the plateau was originally under the Chinese suzerainty, it became, under the Mongolian emperor Chinghiz Khan and his successors, the mistress of China, as indeed of all Asia and of Eastern Europe. As the Mongol power, however, shrunk and withered, the Chinese re-asserted themselves. At length, under a dynasty from Manchuria outside the mountain border, the Chinese became lords over our plateau. The Zungurian tribe of Eleuths rose, and after severe military operations were suppressed. The Mahomedan inhabitants of the Tarim basin rebelled against the Chinese government, and for a while maintained an independent principality for Islam. It was during this time that the British sovereign sent an envoy to Yarkand to conclude a commercial treaty, in 1873. Subsequently the Chinese broke down this rising independence, and the whole region of the Tarim receives its orders from the emperor at Peking. The decline and fall of the Mongol empire, the disruption of that wide-spread dominion, like the breaking up of the ice on its own frozen rivers, are historical themes beyond the scope of this address. But the changes which have

gradually come over the national character of the Mongolians are cognate to the studies of geographers. As already seen, the annals of the Mongols reveal one of the many examples of the theory of causation, explaining how geographical surroundings mould or affect the human character. There remain the mountains, the sea of undulating uplands, which are still among the few important regions not essentially modified by human action. The pine forests, though hardly intact, have not been extensively cleared. There is the dread desert—where to the ears of superstitious Mongols the roll of the mustering drums and the shouts of victorious battle are audible—and which has engulfed in sandy waves additional tracts once productive. The pastoral resources, the nomadic diet and exercise, the tribal organisation, are in kind the same as of yore, though perhaps modified in extent or degree. The short-lived heat may perhaps be gaining strength as the ages advance; but the winters must be nearly as long and hard as ever. Thus the same physical and climatic conditions which once caused the Mongolian nation to become one of the mightiest engines ever directed by man are still surrounding the politically degenerate Mongols of to-day, who are best represented by the tribe of Khalkas. Once audaciously ambitious, the Mongols are now sluggish and narrow-minded; once passionately fond of an independence as free as their mountain air, they are now submissive to the domination of races formerly despised by them as inferior; once proud of a tribal organisation and a voluntary discipline that wrought world-renowned wonders, they are now split up into factions like a faggot of sticks that has been unbound. A man who, though the feeblest of pedestrians, grips with his bowed legs the saddle of the most restive horse as with a vice, is all that remains of the historic Mongol. It is for the social inquirer to determine what have been the circumstances counteracting the climatic and local causes which made this nation potential in moulding mediæval history.

In conclusion, this brief summary of our geographical knowledge regarding the plateau of mid-Asia is provisional only. . . . It is limited to a *résumé* of things imperfectly known, with a view of bringing into strong relief two matters which are unquestionable, namely, the importance of our plateau and the grand field it offers for research. If the public consideration of these matters shall induce inquirers to direct their enterprise towards this grand region, we may hope that by degrees the errors in our facts may be removed, the misdirection of our conclusions remedied, the vagueness of our notions made definite.

Among the more important papers read to the Section were the following:—

Notes on a Visit to the Chukche Peninsula in 1881, based on Letters from Drs. Arthur and Aurel Krause.* Communicated by the BREMEN GEOGRAPHICAL SOCIETY.—In the spring of 1881 the Geographical Society of Bremen decided on sending out a couple of scientific travellers to examine the neighbourhood of Bering's Strait. For this purpose the brothers Krause proceeded to San Francisco via New York, and having secured the services of a Finn, who had served as second mate on board a whaler, to manage the whaleboat with which they purposed examining the coasts, they sailed from San Francisco on the 11th of June, but did not land in Lawrence Bay until two months later. In the course of a boat journey extending from 24th August to 12th September, they erected their tent in twelve different places; the northernmost being Uédle just within the Arctic circle, and the southernmost at Plover Bay. In spite of much unfavourable weather, considerable collections of plants, &c., were made; which, in as far as they have been sent to Europe, have already been distributed for examination among nineteen men

* See 'Deutsche Geographische Blätter,' Bd. iv. Heft 3 and 4 and Bd. v. Heft 1.

of science. Many objects of ethnological interest were also collected or purchased from the natives; some dredgings and soundings were also taken. The temperature at 8 A.M. varied between 41° and 50° F. Rapid surveys were also made of various parts which were imperfectly represented in existing charts. The native population, they learnt, had been much reduced in numbers by famine in the winter of 1879-80. This famine can be traced to various causes, one of which undoubtedly is the sale of alcohol by unprincipled traders, to whom the Chukches part with their valuable fur clothing and so render themselves less able to brave the cold of winter, besides being led into passing the summer in other pursuits and thus neglecting to obtain the necessary winter supplies of food. The whale, too, and walrus, on which they are in a high degree dependant for sustenance, have been in a great measure driven from their coasts within the last twenty years by whaling enterprise. In particular it may be mentioned that the walrus cows are killed at a season when their young are still unable to provide for themselves. In view of these evils the Russian Government has issued a notice, also printed in English, strictly forbidding the sale of alcohol and a few other articles, and also interdicting the capture of the whale and walrus in the immediate neighbourhood of the shore. Partly to enforce these regulations, a Russian man-of-war, the *Strelak*, visited the coast during the stay of our travellers, to whom they afforded very material aid and countenance. The Chukches have hitherto been supposed to be divided into two classes: those who live by fishing and the pursuit of marine mammals, and those who depend on the reindeer for their support. These two classes do not differ either in race or language, indeed, members of the same family may be found in both classes. Although in some localities given to theft and at all times fond of driving the most tedious bargains, the natives were not difficult to deal with. In general the clothing resembles that of the Esquimaux; tattooing seems to be universal among the women. Although the sale of gunpowder is nominally prohibited, many of the natives possess excellent firearms, and are expert in their use; at the same time, the sling, the spear, and also the bow and arrow are retained from motives of economy in the pursuit of small game. The whale and walrus are followed in large boats made of skins. Under proper management it was found that these boats can land through a very heavy surf. Particularly interesting is the trade which exists between the seafaring Chukches and the American Innuits on the one hand, and between the former and their pastoral relatives on the other. The chief articles of barter are tobacco, purchased from the whalers, and various kinds of furs and native clothing. One of the natives had an accumulation of stores worth fully 1000*l*. On the small grave-mounds are deposited, in accordance with the well-known custom, various articles indicative of the occupations and sex of the deceased. On the women's graves of recent date, amongst objects of native origin, it is interesting to note cooking-vessels made from preserved meat-tins. Here and there along the coast are to be found small communities differing completely in language and to some extent in features from their Chukche neighbours. The Drs. Krause consider the language of these people as indicating a relationship with the American Esquimaux. This opinion is confirmed by the fact that out of twenty-six specimen words the only two known to the writer (*nanuk*, polar bear; and *naskok*, head) agree, in one case exactly and in the other very nearly, with the same words in the language of the Greenland Esquimaux. Had the voyage from San Francisco not been so unfavourably long, it would have been quite practicable to have made a journey into the interior.

In Lawrence Bay was found a stratum of marl concretions like the Norwegian *Mergelboller*, containing quaternary fossils of molluscs not differing apparently from forms still existing in the neighbouring waters. Mammoth bones were also found in the same layers. East Cape, which forms the easternmost extremity of

Asia, is a bold, rocky promontory of syenite, almost cut off from the mainland by swampy flats and shallow lakes across which the natives effect a portage when the outer sea is impassable from ice. On the northern side of this cape is Uéle, the largest village met with; it consists of 83 huts—*jarangs*—with a population of about 260 souls, but as the natives move about a good deal, it is not easy to obtain an idea of the number of inhabitants in the whole region. The longest journeys are taken in winter, when excursions of three months' duration are not infrequent. In the famine already mentioned nearly all the dogs were eaten, so that the few remaining command very high prices, and winter journeys are doubtless rendered more difficult from the want of these valuable aids to sledge-travelling. Drift-wood seems to be generally abundant on the shores of the mainland, where it is collected in large quantities by the natives for fuel and hut-building, and also in a slight degree for export to some of the neighbouring islands where none is cast ashore. It should be mentioned that the Chukche women and children collect considerable stores of vegetable food for use in the winter. In addition to crowberries, which are very abundant, the leaves of the round-leaved saxifrage, two kinds of polygonum, the dock, and mountain-sorrel are either eaten raw with seal-oil or boiled in water until they form a fairly palatable dish. To establish friendly relations with the natives it is quite essential for the traveller to be provided with a supply of molasses and ship's biscuit with which to entertain visitors on state occasions. The zoological labours of the travellers were at times rendered almost impracticable from the necessity of keeping their supply of alcohol (for which a special permit had been obtained) concealed, as the fact that it was strongly dosed with tartar-emetie would not have sufficed to protect it from the Chukches. On the whole, a fairly complete collection of plants was made, the comparatively warm autumn favouring second flowering of the earlier varieties. The ground readily admitted of being divided into three well-marked classes:—1. The stony or lichenous Tundra, which was comparatively rich in lichens; 2. The wet-moss Tundra; and 3. The slopes and valleys, where the vegetation was comparatively luxuriant, and the willow attained a height of fully three feet. Of land mammals only the Siberian marmot (*Spermophilus*) and the whistling hare (*Lagomys hyperboreus*) were met with; but according to the natives the wild reindeer and mountain sheep, as well as foxes, bears, and wolves, occasionally make their appearance on the coast. Eventually the travellers left Plover Bay on October 3rd, and reached San Francisco on the 5th of November. After a stay of a fortnight they proceeded to Chilkoot in Alaska, where they passed the winter at the special invitation of the North-west Trading Company. Recently one of the Drs. Krause has returned to Europe; but the other is still in Alaska, where he hoped to examine the basin of the Yukon river this summer.

The question of an Overland Route to China from India viâ Assam, with some remarks on the source of the Irawadi River. By CHARLES H. LEPPEL.—The author traced a short history of the little already done to solve the important problem indicated by the title, and showed that there is *steam-transit* all the way from Europe to our extreme north-eastern frontier outpost nearest to China, viz. Makum, and that there is no physical objection against continuing the railway now in progress of construction to Makum from that outpost all the way to the banks of the Irawadi river. He pointed out that the inhabitants of the country through which this extension of the railway would have to pass are Singphos, who are very friendly to the English, and are quite independent of the Burmese, and also of the Chinese. These Singphos have further expressed a wish that a road should be made through their country, as they are alive to the

advantages they would reap from it. Mr. Lepper then explained that Chinese traders already visit and settle amongst these Singphos, on this independent, or as he calls it "neutral ground," and that were a road, or railway continued from Makum to the Irawadi, a distance of only about 120 miles, there can be little doubt the adventurous Chinese traders who now traffic on the Irawadi would be induced to come to us for British merchandise. Thus the whole of Western China would be thrown open to British commerce, without the necessity of any treaty with China, and without any European having to cross the Chinese frontier. Further, the Tibetans, who already trade in this western part of China, would avail themselves of these Chinese traders as intermediaries between themselves and us, and in this way Eastern Tibet would also be opened to British commerce, and English goods would take the place of Russian goods, which latter now almost exclusively represent European markets in Western China and Eastern Tibet. With *steam-transit* all the way from Europe to the banks of the Irawadi, at the latitude Mr. Lepper speaks of, there can be little doubt that the question of the best route from India to China overland would be solved, as the road would nowhere enter or be subject to the King of Burmah's dominions, and thus our goods would be landed without dues or "squeezes" at the very frontier of China, practically speaking. Mr. Lepper pointed out that notwithstanding the new era which is sure to open for this frontier once the railway to Makum is opened—next year—nothing is being done to prepare for the new order of things, and that there is not a single European who can speak the Singpho language, or who knows the prejudices, manners, and customs of the Singphos, although Makum itself is situated among Singpho villages, which are scattered about and within our frontier in this direction. He then explained the advantages which would be derived on the opening of this route by British merchants, owners of tea properties in Assam, the Public Works Department of Assam, and last, but not least, by Bengal in its times of famine. Mr. Lepper then called attention to certain data he had collected in excursions across the Assam frontier, which went to show that the Irawadi could not take its rise much farther north than latitude $28^{\circ} 30'$.

On Some Points of Physical Geography observed during a Recent Tour round South America. By JOHN BALL, F.R.S.—This was a *viva voce* discourse addressed to the Section by the author, without notes or preparations, at the request of the President. Mr. Ball said:—

To the physical geographer the most striking feature of South America is the remarkable contrast that exists between the climate of the eastern and western sides of the continent. On the eastern side of the great range of the Andes, which extends from north to south a distance of more than 3500 English miles, you find throughout the vast empire of Brazil, from some degrees north of the equator to the tropic of Capricorn, copious rains which maintain extraordinary fertility and the full luxuriance of the tropical fauna and flora. On the opposite or western side the tropical climate with its characteristic vegetation extends to the Pacific coast from the isthmus of Panama to the bay of Guayaquil. But the headlands which mark the southern limit of that bay—capes Parinas and Blanco—also mark a sudden and complete change of climate. From the latter cape, lying about five degrees south of the equator, the comparatively narrow strip of land lying between the Andes and the Pacific coast—for a distance of fully 1500 miles—lies in what has been called the rainless zone of western South America. The term is not strictly accurate, for, with a single exception, in every place that I am acquainted with on that coast, some rain does occasionally fall at long intervals which may vary from two to seven or eight years. In extra-tropical South America the contrast between the climate of the

opposite coast is equally marked. In the southern provinces of Brazil and thence southward to the estuary of the Plate the climate shows a gradual transition from the moist tropical type to the dry character of the *pampas* region, which in a more marked degree prevails in the south of the Argentine territory and through eastern Patagonia. Exactly an opposite change occurs on the western side. In Chili, from Copiapo, where rain is rare and insufficient, to Valdivia, where it is excessive in amount, there is as you travel southward a gradual and steady increase in annual rainfall, with a corresponding change in the vegetation. The coast south from Valdivia, extending throughout western Patagonia to the western end of the Straits of Magellan, is apparently the part of the earth out of the tropics where the annual rainfall is greatest. In the absence of any permanent settlement of civilised men there is of course no continuous record of temperature, and no observations of the amount of rainfall, but the testimony of all travellers and of the seamen who constantly visit the coast is quite unanimous on this point. The first difficulty which struck me on the west coast was to account for the extremely rapid transition from the tropical to the desert type at the northern extremity of Peru.

At Guayaquil in Ecuador frequent heavy rains and a mean temperature of about 82° F. are accompanied by the characteristic vegetation of the equatorial zone—mangrove swamps by the shore, various palms, *Melastomaceæ*, forest trees laden with epiphytes, &c. And at Tumbes on the south side of the bay, which is the northernmost point of Peruvian territory, I was assured that the climate and vegetation are quite the same as at Guayaquil. On a fine evening we steamed out of the bay and passed the adjoining headlands of Cape Blanco and Parinas—the latter being the extreme western point of South America—and before sunrise next morning found ourselves opposite Payta. The coast appeared absolutely bare of vegetation. An undulating plateau some three or four hundred feet in height descends in steep slopes or rocky crags to the shore. When preparing to land I was assured that it was useless to take a botanical box, as I should find nothing.

In point of fact twelve species of phanerogamous plants were found in a walk of two or three hours, and the inhabitants stated that excepting one or two slight showers lasting a few minutes, no rain had fallen for two years. Now Payta is in a straight line, scarcely more than a hundred miles from Tumbes, and such a contrast between the climates of two places so near together is, I believe, without example elsewhere. The first of the two causes which are generally assigned for the existence of the rainless zone is the influence of the Andes chain in arresting the moisture-laden aerial currents from the Atlantic. But the Andes of Ecuador and New Granada, including many of the highest summits—Chimborazo is seen in clear weather from the town of Guayaquil—extend far to the north of Cape Blanco, and we know of no reason why their screening effect should be felt to the south of that point and not to the north of it. The other agency believed to cause the existence of the rainless zone is the cool ocean current from the South Pacific, sometimes called the Humboldt current, which flows northward along the west coast of South America. This certainly extends as far north as Cape Blanco, and it apparently does not enter the Bay of Guayaquil, but during part of the year, at least, it is felt much to the north of that bay, and actually crosses the equator, causing the comparative cold which often induces travellers to don their great coats when crossing the line. The fact that the cool current does not enter the Bay of Guayaquil may account for the temperature of its shores being much higher than that of the coast farther south; but mere heat without abundant moisture will not produce luxuriant vegetation, and it is the source of that moisture and its strict limitation on the south side that is here to be accounted for. Another difficulty connected with the rainless zone of Western America is the fact that the dryness of the climate appears

to reach its maximum not in the warmest part but near to and somewhat south of the tropic of Capricorn, and especially on that part of the coast which before the recent war belonged to Bolivia but has now been annexed to Chili. It is there that, according to all the information I have received, intervals of five, six, or seven years occur during which absolutely no rain is seen to fall. I know of but one place where I have not been able to ascertain that rain has ever been seen. When astronomers tell us that no water exists on the surface of the moon it is impossible not to feel curiosity as to the appearance which such a surface must present. Those who wish to gratify that curiosity as to lunar scenery should land at Tocopilla. It is a place where there is not the slightest indication that water has ever touched the surface above high-water mark. After careful search I failed to find the slightest trace of vegetation. No speck of lichen could be seen on the rocks, every edge of rock was perfectly sharp, showing no sign of weathering, nor could I trace any appearance of water having ever flowed in a channel or furrow of the surface.—The climate of Western Patagonia and the Straits of Magellan offers several problems for which I am not at present able to suggest solutions. In passing from the Gulf of Peñas to the Straits of Magellan through the magnificent scenery of Messier's, Sarmiento and Smyth's channels, a distance of about 450 English miles, it appeared to me that there was very little indication of change of climate. The flora shows little, if any, change, and the only difference seen in going southward is that the height of the superior limit of tree vegetation seems to be lowered by two or three hundred feet; but throughout the whole tract, as well as in the western half of the Magellan Straits, you find clear evidence of a comparatively mild damp climate; dense masses of evergreen trees and shrubs and delicate ferns clothe the lower slopes of the mountains. A marked change in the appearance of the coast is seen on passing Cape Froward, about the middle point in the Straits of Magellan, the eastern side appearing to have a decidedly drier, though not a colder, climate. In the neighbourhood of Punta Arenas, or Sandy Point, where I spent five days, I found but a single fern and but few of the same species of phanerogams which I had seen when landing on the coast in the channels. The important fact, however, for which I know of no adequate explanation, is the mildness of the climate, and especially of the winter climate, of the Straits of Magellan. The record of meteorological observations made for several years at Punta Arenas by Dr. Fenton, the excellent medical officer of the settlement, was unfortunately destroyed during the revolt of the convicts at that place, and I am not aware what amount of positive information of a reliable kind is now available; but my own experience, joined to such facts as I was able to collect, and the direct testimony of the flora, lead me to conclude that the climate is little colder than that of the north of England, and that the winter climate is much milder than that of places in the same latitude on the Baltic coast. It is well established that the southern hemisphere, especially to the south of the fiftieth parallel, is much colder than the northern hemisphere, and much reasoning has been expended on explaining the causes of the exceptionally mild climate of Western Europe, but I fail to see that any adequate reasons have been given for the peculiarities of the climate of the Magellan Straits. It must be remembered that the places whose climate appears to be anomalously severe, such as South Georgia, the South Shetlands, Kerguelen's Land, &c., are small islands lying in the direct track of the vast masses of ice annually detached from the antarctic polar continent.—Finally, I may remark that the opinions commonly derived from physical atlases as to the regular distribution of the winds and ocean currents in the north and south Atlantic will require much correction when the local phenomena have been fully studied. In truth, the winds and currents are far less regular than is commonly supposed. I imagined that my own recent experience must be something quite

exceptional, but I have had the assurance of two experienced navigators that it is by no means unusual to find throughout the entire voyage from the river Plate to Lisbon contrary head winds and opposing currents.

On the Geographical Evolution of the Tanganyika Basin. By JOSEPH THOMSON, F.R.G.S.—The keynote of this paper is struck by a reference to a recent lecture of Dr. Archibald Geikie, to the Royal Geographical Society, in which he points out that the days are now over in which the scientific geographer is content with the simple description of the superficial aspects of the various regions of the globe. He must also know how they came to be, and what they have been in the past. This line of inquiry is applied by Mr. Thomson to the lake regions of Central Africa, but more particularly to the Tanganyika Basin. In the first place he presented a bird's-eye view of the lake regions from the Indian to the Atlantic Ocean, bringing into relief only the most prominent features of the geography, but describing more in detail the aspect of the Tanganyika Basin, round which the chief interest centres. From a description of these purely superficial matters he proceeded to describe what these have been in the remote past, and the manner in which they have been evolved, being of course compelled to call in the assistance of the sister science geology. The conclusions he arrived at as to the primary origin of the region are, from purely hypothetical considerations, based on the theory of a shrinking nucleus, and the necessary effects on the earth's crust arising therefrom. At a later stage, however, he is on safer ground when he is able to appeal to the rocks themselves as to the aboriginal conditions of the African continent south of the Equator. These, according to Mr. Thomson, prove the existence of an immense central sea cut off from the ocean by the elevation of the continent, and which was almost continuous with the present drainage area of the Congo. An elevated ridge was upheaved along the eastern boundary of this sea, the origin of the trough of Tanganyika, by the collapse of the centre of this ridge, and the central sea subsequently drained away to the west, leaving Tanganyika isolated. Mr. Thomson then proceeded to describe how its secondary characters arose, and its scenery was moulded, by the action of sub-aërial denudation on rocks of different powers of resisting the decomposing and eroding agents, and explained the curious marine-like type of its shells, the origin of its outlet, the Lukuga, the freshening of the water of the lake, and finally the curious intermittency of the outflow. The various stages in the evolution of the Tanganyika Basin were summarised as follows:—The first appearance of the future continent, we have been led to believe from various theoretical considerations, was the appearance of a fold of the earth's crust bounded by two lines of weakness converging towards the south, which fold gradually rose till it appeared above the ocean, first along these two lines of weakness, in the form of a series of islands, which finally join, enclosing in their centre a large part of the ocean. This enclosed water area formed a great central sea, and the enclosing land along the lines of weakness is now indicated by the east and west coast ranges. In the second stage the continent of Africa south of 5° N. latitude presented the outline of the continent of to-day. The third stage shows the central plateau with the great central sea very much diminished in size and almost coinciding with the present Congo basin. There is as yet no evidence of the existence of Tanganyika. After an enormous period of undisturbed deposition of sand in the sea, the fourth stage is ushered in by a period of great continental convulsions. On the line of the future Tanganyika a huge boss of rock is intruded into the throbbing crust, and the surrounding region elevated to a considerable extent, followed by the subsequent collapse of the body of the elevated area originating the great abyss of Tanganyika. The fifth great stage is marked by the formation of a channel through the western

coast mountains, causing the drainage of the great central sea, which immediately becomes the inner drainage area of the Congo. The sixth stage then sees Tanganyika isolated as a lake by itself, from which time dates the moulding of its present scenery, the formation of an outlet, the freshening of its waters, and the lowering of its level, and finally we have seen that the intermittency of the lake's outflow is explained by the probable fact that the rainfall and evaporation nearly balance each other in ordinary seasons.

On the Royal Geographical Society's Map of Eastern Equatorial Africa. By E. G. RAVENSTEIN.—The map, the construction of which had been entrusted to him by the Council of the Royal Geographical Society, was intended to embody, in a tangible manner, all the information that had been collected up to the time of publication. Large as had been the number of African explorers, much yet remained to be done before our knowledge even of the more accessible parts of Africa could be looked upon as satisfactory. Apart from the line of coast, where the minute surveys of Captain Wharton and others afforded an excellent base, there were but a few isolated localities which had been determined in a trustworthy manner by astronomical observations. On the Upper Zambezi, Livingstone, Mohr, and Serpa Pinto differed in their results to a very serious extent. Between Zanzibar and Tanganyika the only point satisfactorily determined was the capital of Unyanyembe (where Speke observed), whilst the delineation of the lake depended upon Captain Cambier's determination of Karema. Von der Decken's expedition had supplied trustworthy information as regarded the position of Kilimanjaro and other points nearer the coast. In Southern Abyssinia, M. d'Abbadie's network of triangles, supplemented as it had been recently by Cecchi and Chiarini, afforded an excellent basis for mapping a wide stretch of country. The exact determination of the course of the Upper Nile we owed to Captain Watson, R.E., who was fortunate enough to observe a transit of Venus whilst at Gondokoro in 1872. It resulted from this observation that Khartum lay eight miles to the east of the position assigned to it by Captain Bizemont, a change sanctioned by the careful surveys made between El Fashr, Khartum, and Dongola, by the English engineers working under Mr. Fowler. Good longitudes were few and far between, but latitudes were fortunately very numerous.

As to altitudes, the results were most discordant, and differences of a thousand feet in a total altitude of 5000 were by no means rare. The establishment of permanent stations by the French and German African Associations would no doubt render future observations for height more trustworthy. For the present, he thought, we were safe in assigning to Tanganyika a height of 2700 feet, whilst the Victoria Nyanza lay probably at an elevation of 4000 feet. After a rapid examination of the principal explorations which had yielded materials for the map, the vast region stretching along the eastern margin of the Victoria Nyanza right away to Southern Abyssinia and Harar, was pointed out as the vastest and most promising field of exploration in Eastern Africa.

The Deserts of Africa and Asia. By P. DE TCHINATCHEF.*—The large sandy surfaces which occupy immense tracts on our globe suggest naturally the belief of their being recently dried-up sea-bottoms, an impression enhanced by the presence of salt efflorescence and shells of still existing molluscs. It is therefore not surprising that the two largest deserts in the world, viz. the Sahara in Africa and the Gobi in Asia, have been, or are even sometimes now, considered as representatives of recently raised-up sea-basins. But the latest explorations tend to

* [Abridged.]

prove the contrary, at least as far as the Sahara is concerned, and the little we know of the great Asiatic deserts seems to lead to a similar result.

Since Algeria (which I visited two years ago) has been annexed to France, our knowledge of this country has made very rapid progress, so that the ideas which were formerly entertained of the Saharan desert have at present undergone an entire change. It has been ascertained that those sand-deposits, which hide the solid framework of the country, are comparatively local phenomena, and that in the greatest part of the Sahara-Lybian desert the subjacent strata are perfectly conspicuous, either by cropping out through the superficial deposits, or by rising as mountains and hills, which almost all belong to the cretaceous formation, and cover an immense tract of this part of Africa. M. Rolland, who has particularly studied the cretaceous formation of the Sahara, speaks * with astonishment of its extraordinary development, not only in the French Sahara, where it occupies an area equal to that of all France, but also in the whole of the African desert, touching the Red Sea on the east and the Atlantic on the west. "For in all those regions," says M. Rolland, "cretaceous strata, containing the same fauna and having the same mineralogical composition, are developed on a line of 60 degrees in length, by 3 to 6 degrees in width. No later sediments repose on these rocks, with the exception only of some quaternary deposits, filling up, in the Lybian desert, the depressions between the cretaceous mountains."

The regions of Sahara not occupied by cretaceous mountains and hills consist in large surfaces, more or less horizontal, composed either of loose sands or diluvial (quaternary) deposits. Those last seem to have formed so many gulfs, which, after the emergence of the cretaceous masses, remained covered by the sea, and were filled up in a comparatively recent epoch, for they contain shells of molluscs belonging to species still living.

As for the rocks which underlie the sandy deposits, what we know of them is due to the numerous wells sunk by the French all along the northern boundaries of the Sahara, particularly in the province of Constantine. The learned engineer, M. Jus, who during twenty years has directed those admirable works, ranges in the pliocene formation the different rocks (limestone, sandstone, marls, gypsum, &c.), traversed by the soundings, as well as the impermeable water-bearing clay which forms the bottom of the wells. This clay presents the most astonishing discrepancies in its level, being sometimes many hundred feet below the surface of the soil, and sometimes approaching it very nearly. Thus, for instance, in the region of Ued-Rir, there are two wells named Aïn-Kerma and Un-el-Thiur, distant one from the other about 40 miles, the depth of the first of which is only 44 feet, and that of the second 321 feet. In the country of Honda the well named Nemechdib is 10 feet deep, whereas the well Barika, almost close to it, is 117 feet. Again, at Batna and at Biskra, the soundings have been driven through more than 540 feet, without reaching any subterranean water, so that the works were abandoned, most unfortunately for those two cities, which are suffering from the want of good water. The same thing happened at Tahin-Bacu, where at the depth of 300 feet no water could be reached.

We must consequently admit that the pliocene impermeable clays, before having been covered first by different rocks, and finally by sand, have been exposed to some powerful agents which caused their surface to undergo the most various changes, so as to produce more or less deep excavations in some places, and to leave others (often quite near the first) in the shape of high conical masses, with hollowed basin-like tops.

* 'Comptes Rendus des Séances de l'Acad. des Sc.,' 1879, t. lxxviii. p. 778.

Another curious phenomenon which the sinking of the Algerian wells has revealed is the discovery of fishes, crabs, and fresh-water molluscs, at considerable depths. This interesting fact has been ascertained in the artesian well called *Meza*, situated in the desert of Ued-Rir, quite near one of the brackish lakes (*Chott* or *Solles* of the Arabs) which are so numerous in the region between Biskra and Tuggurt. When the sounding-line brought those creatures from a depth of about 230 feet, they were perfectly alive, and M. Jus even boiled a crab, and found it of excellent taste. The fishes were covered with sand and mud, but the shell of the crabs was quite bright and glittering, a proof that they inhabited pure water. M. Jus showed me all those animals, preserved in spirit, and adorning his rich collections at Batna.

The wells constructed by the French engineers numbered at my last visit (1879) in the province of Constantine alone (and there are many elsewhere) more than 155; and as the works begun in 1856 have never been interrupted, and are rapidly advancing into the interior of the desert, the time may not be far off when all those regions, now so barren and so dry, will be copiously irrigated, an advantage which they certainly enjoyed once before, seeing that the numerous oases spread over the Sahara and the Lybian desert contain many remains of Greek and Roman constructions; a proof that they were once populated and consequently provided with water. This was most probably got by means of the same so-called artesian wells, which although assumed to be a modern invention were undoubtedly known to the ancients, and were even constructed in the desert of Sahara, as proved by a statement of Olympiodoros, a historian whose writings have perished, with the exception of a few fragments quoted by the learned Greek patriarch Photius, one of which contains the following important passage: "In the oasis of Sahara the inhabitants used to scoop out excavations 100 and 250 feet deep, from which jets of pure water rise in high columns."

Since the invasion of the destructive Ottoman race all those monuments of ancient civilisation have disappeared, and it is the glorious task of France to revive them in Algeria. Her exertions have been crowned with success, and among the numerous improvements which have transformed the country in a most marvellous way,* none is so admirable as the creation of this network of artesian wells, established on a line of about 500 miles of length, and penetrating every day deeper into the desert. This achievement is quite sufficient to secure for France a prominent place in the history of civilisation, infinitely higher than that gained by military successes.

The artesian wells of Algeria suggest many other scientific considerations, but I will limit myself to a few words upon the probable origin of the subterranean waters which feed these wells, and of the enormous sand-accumulations which cover the desert.

In the Lybian desert, which is only the eastern continuation of the Sahara, Dr. Zittel is of opinion that between the oasis of Siwah (the seat of the famous temple of Jupiter Ammon) and the Nile, there is a large subterranean depression excavated in the impermeable clays and marls which compose the underground of a great part of the desert. The strata of the northern side of the depression dip to the south, so as to prevent the water gathered in it from escaping to the Mediterranean, and the waters furnished by the copious rains falling in the mountainous tracts of Central Africa, penetrate until they reach the impermeable clays, and in this way are carried to the above-mentioned natural reservoir. The

* This I have endeavoured to prove in my work '*Espagne, Algérie et Tunisie*,' Paris, 1880.

supposed stratigraphical conditions of this depression have been suggested to the German geologist by the sections which he observed in the oasis Beharrich, situated near the Siwah oasis, where the strata of clay and marl are perceived to dip to the south.

A similar subterranean reservoir may exist also in the Sahara, but as far as I am aware nothing of the kind has been yet ascertained there, so that in the present state of our knowledge we are reduced to the supposition that the large subterranean watersheds are chiefly produced by the rains in the mountainous country forming the northern boundary of the Sahara, and among which the Aurès range plays an important part. Most probably the waters furnished by those mountains (for in the Sahara itself rain is very rare) ooze through the different open crevices, joints, faults, &c., and penetrate into the impermeable argillaceous strata. At any rate, the above-mentioned presence of fishes and crabs in the well of Mezer, proves that a communication between the atmosphere and the subterranean waters must exist, otherwise no animal (at least of the higher classes) could live there.

The last but not the least important geological element of the Sahara-Lybian desert is the sand, which contains no organic remains except at places where it is intermingled with underlying older diluvial deposits. Those enormous sandy accumulations doubtless are not of marine but of sub-aërial origin. Still their vast proportions render it difficult to decide the question whence they came and how they have been formed. Dr. Zittel, to whom we owe valuable observations on the Lybian desert, thinks that those accumulations of sand are on too large a scale to be explained by Baron Richthofen's theory of the formation of the *loess* in China, though he concedes to the action of winds an important part in the African deserts also. In consequence Dr. Zittel admits that those sands have been transported not only by atmospheric movements but also by water-floods. And as the desert sands consist of quartz which could not have been furnished by the limestone and marly rocks prevailing in the desert, he supposes that it may have been derived from the so-called Nubian sandstone of which the mountainous range situated in the southern part of the Lybian desert consists, and which, after long discussions among the geologists, has definitely been placed in the cretaceous formation. Dr. Zittel thinks that the disintegration of this sandstone has been produced by water, the erosive power of which has left in the desert so many conspicuous traces, as, for instance, the high and steep sides of the oasis, the deep depressions, and particularly the isolated rocks he calls "insular mountains," considering them as the scattered remnants of once connected masses, so that, according to the German geologist, such gigantic denudations can only be the work of violent fresh-water floods coming from the south and carrying the large quantity of petrified tree-trunks so frequent in the Lybian desert. Several objections arise against this theory, at least as far as the Sahara is concerned, the southern boundaries of which are not composed, as in the Lybian desert, of sandstone, but chiefly of limestone, marls, and clay, and consequently could not furnish the quartz grains yielded by the Nubian sandstone. Moreover, the violent fresh-water floods proceeding from the south, which, according to Dr. Zittel, caused in the Lybian desert the above-mentioned enormous denudations and erosions, suppose an extraordinary change in the climate of that country; for, granting all that Dr. Zittel advances as to the much greater atmospheric humidity in Egypt and the neighbouring countries at a former comparatively recent epoch, such powerful floods could only be produced by rains unknown in the most rainy regions of our globe. At all events M. Rolland thinks that so far as the Sahara is concerned, the quaternary and alluvial sandstones which the desert contains are sufficient for the production of sand-accumulations, which, according to him, are derived from actual atmospheric agencies, namely,

first, by disintegration, and then by the winds scattering the grains over the surface of the desert.

The sandy superficial deposits form the last chapter of the geological history of the Sahara, for, as far as I know, no well-ascertained traces of the glacial period have been discovered either in Algeria or in the Sahara-Lybian desert, so that the absence of the glacial period in those parts of Africa furnishes an additional proof of the *local* and comparatively *limited* character of this important phenomenon, a fact on which I have repeatedly insisted in numerous publications.*

But if, after the formation of the superficial sandy masses, the Sahara had acquired the most prominent features of her present physiognomy, still, since that time, not only the hydrographic and climatic, but also some of the topographic conditions of the country have undergone very important modifications, as may be deduced from many facts, among which I will mention only those pointed out by Rolland and Clavé. The first of these authors calls our attention to the numerous incrustations of travertine, evidently produced by sources which have disappeared, and moreover to the immense quantity of siliceous fragments worked and shaped by human hand, and scattered about large tracts of the desert, where it is not likely that they may have been transported. M. Rolland sums up the conclusions derived from a great number of similar facts in the following words: "The climate of Algeria must have suffered a considerable deterioration since the time of the Romans." M. Clavé is of the same opinion. He mentions with astonishment the quantity of fragments of arrows made of polished flint, scattered on the whole space between Biskra and Uargla; and what is still more significant, he has observed in the neighbourhood of Oglu-el-Kassi, such fragments covered by a coating nearly 20 inches (5 decimetres) thick of gypsum, evidently deposited by sources of which all traces have vanished. "Those flint-fragments invested by gypsous incrustations," says M. Clavé, "are most probably the oldest known witnesses of human industry." Now, the Lybian desert yields to Dr. Zittel exactly similar conclusions. The learned German geologist observes that between the oasis Chargeh and the valley of the Nile, the basaltic tufa include leaves of plants, among others, of the evergreen oak (*Quercus ilex*), which no longer exist either on the oasis or in Upper Egypt. "The caves bristling with stalactites in a country perfectly devoid of water," says Dr. Zittel, "but particularly the polished and well-worked flints accumulated on different points of the now thoroughly dry and empty desert, speak distinctly of a much more favourable climate than the present one."

No doubt such climatic changes, if ascertained to have occurred in the Sahara-Lybian desert, must have taken place in the countries surrounding the Mediterranean basin: Egypt, Syria, Asia Minor, &c. And that is really the fact; the arguments supporting it being as numerous as convincing. It would not be consistent with the limits to which I am restricted in the present paper to mention even a small number of them, so that I must content myself with the following observations.

In his remarkable work on the climate of the Mediterranean countries,† Theobald Fischer, after discussing the changes which it has undergone in historical times, comes to the conclusion that such changes have not been very conspicuous in the region of the northern shores of the basin, where the climatic modifications, which I had pointed out in Asia Minor, are considered by him as only local

* 'Une Page sur l'Orient,' pp. 251-72; 'La végétation du Globe'; 'Espagne, Algérie et Tunisie,' p. 429, &c.

† "Studien über das Klima der Meditteraneen Länder," in Petermann's 'Mittheilungen,' 1879.

and exceptional phenomena, but that it is quite different in the regions situated on the southern shores of the Mediterranean, to the south of the 34th parallel, where rains, even in their normal state, are so inconsiderable, that the smallest reduction of their amount is sufficient to alter the climate. Among the countries liable to such reductions, Theobald Fischer quotes Syria and Palestine, countries full of traces of ancient rivers and artificial irrigation, indicating a region once thickly populated, but which now is transformed into a dry desert, not only by the fault of man, but also in consequence of a complete change in the atmospheric conditions. Theobald Fischer points out equally the numerous deeply excavated *wadys* in the whole of Africa, which doubtless represent so many beds of ancient rivers, in a time when rains were much more frequent than now. This important fact was elucidated and discussed, in a masterly way (many years before the publication of Fischer's work), by David Livingstone.*

According to Theobald Fischer, the increase of the atmospheric dryness in North Africa is equally proved by the disappearance of the large mammals and the late introduction of the camel in those regions. This animal, now quite indispensable for desert traffic, seems to have been unknown in Africa until near the Christian era, for no figure of it has hitherto been discovered on the monuments of Egypt and Meroë, and Polybius, speaking of the Carthaginian cavalry, mentions elephants but never camels. I had previously the opportunity of pointing out this interesting fact in Asia Minor,† quoting numerous classic authorities, and among others Herodotus and Xenophon, who both attribute the victory of Cyrus, in the battle of Sardes, over the Lydian king, to the presence in the Persian army of camels, the sight of which struck the Lydian cavalry with terror and made them fly. Even in the sixth century of our era, the historian Procopius mentions a similar impression produced on the Roman cavalry by the sight of the camels employed in the Arabian army; but what is still more remarkable is, that as late as the twelfth century, Glycas reporting in his 'Annals' the battle of Sardes, together with the statements of Herodotus and Xenophon, in reference to the impression produced by the Persian camels, does not add to this quotation any remark upon the difference between the habits of the camels of the ancients and those of his own time, which seems to prove that he did not find anything extraordinary in such statements, and that consequently even in the twelfth century, the camel had not acquired in the East the perfect indifference he professes now for horses, as I often have experienced it, keeping camels and horses tied up together without causing them the least annoyance.

Theobald Fischer quotes the authority of Herodotus and Pliny, and cites many ancient monuments adorned with animal figures, in order to prove that in historical times North Africa was inhabited by the elephant and the rhinoceros, and, what is still more significant, by crocodiles; for those amphibians suppose the existence of rivers not liable to be dried up. It is impossible to attribute the disappearance of all those animals only to the action of man; the less so as the countries where they have been mentioned were infinitely more populated than they actually are, and therefore offered to wild beasts a less favourable abode than now. We are consequently compelled to admit an alteration in the climatic conditions of the country, namely, an increase of atmospheric dryness, which may account for the late introduction of the camel in North Africa and Asia Minor, as well as for the disappearance of the elephant. In support of this opinion, Theobald Fischer

* 'The Last Journals of David Livingstone in Africa,' &c., by H. Waller, London, 1874, i. p. 215-20.

† Tchihatchef, 'Asie Mineure, Climatologie et Zoologie,' p. 757.

reminds us, that both in Asia and Africa the elephant excludes the camel, and *vice versa*, so that in the upper part of the valley of the Nile, where the elephant prospers, the camel thrives with difficulty.

Dr. Oscar Fraas, the learned German geologist, who had the merit of discovering, near Jerusalem, nummulites in *tertiary* deposits, quotes equally the absence on Egyptian monuments of any figure of the camel, and that not only in the famous ruined city Saqára, the walls of which are covered with pictorial representations of different animals, but also in Thebes, founded 3000 years after Saqára. This fact proves that at that time the desert did not exist, further proof being afforded by the numerous splendid monuments, which would certainly not have been built in the midst of inhospitable solitudes, any more than the Emperor Adrian would have erected near Rome the famous Villa Adriana amidst marshes, had they existed then as now. Oscar Fraas is of opinion that in Egypt the climatic conditions were quite different from what they now are, even in the time of the Greeks, when Alexandria was the brilliant focus of science and art, radiating her light on the whole then known world. He believes that the extraordinary intellectual activity which animated this city, supposes another climate, a less dry air. "On the present soil of the Nile," says Oscar Fraas, "no philosophical system will be born, and no human power will be able to erect there universities capable of vying with those of Europe."

The few instances I have reported are sufficient to prove that the climate of the Sahara-Lybian desert, as well as that of the countries surrounding the Mediterranean, has really undergone important alterations, even during historical times. Now there are proofs that similar changes in the level of the ground and in the vegetation of these regions have equally taken place at a comparatively recent epoch. Theobald Fischer, whom I have already had occasion to quote, has devoted to the study of the topographical modifications of the Mediterranean countries the same talent and erudition with which he has treated the question of the successive climatic changes which occurred there. In his paper, published in the geographical journal of Berlin,* he elucidates this subject in a masterly way, and the map annexed to his paper represents graphically the numerous alternate submersions and emersions positively ascertained in the littoral regions of almost all the countries surrounding the Mediterranean. On the African shores this phenomenon is particularly striking, as much by its intensity as by the variety of its manifestations, the movement of the rising and the sinking of the land occurring alternately on the same littoral line, in localities not far distant the one from the other. Gerhard Rohlfs, the known African explorer, has ascertained the sinking of the whole shore of Tripoli as far as the Gulf of Great Syrte, and, according to him, this sinking is so conspicuous that he was perfectly able to appreciate it during his repeated visits to the country. He quotes very remarkable instances of this phenomenon and says: "I don't think that anywhere on our globe such a rapid sinking of the land has ever been observed."

Now, a quite opposite movement of the land occurs in the neighbouring Tunisian shores. Here Dr. Barth discovered near the modern town of Gabés ruins of a much older one, which he identifies with the ancient city *Tuscape*, a city situated, according to the Greek and Roman writers, on the sea-shore, which is no longer the case with the modern Gabés. Sir Granville Temple has observed traces of an ancient gulf penetrating from Gabés into the interior of the continent, and connected with the lake or Chott el Fedjedj (the ancient *Tritonis lacus*), a connection which has been interrupted by the rising of the tract, which, under the shape of an isthmus, separates now the gulf of Gabés from the lake. Nearer to Tunis we find the bay of

* 'Zeitschrift der Gesellschaft für Erdkunde zu Berlin,' 1878, xiii. p. 151.

Porto Farina, which, two centuries ago, was considered as an excellent port, 80 to 50 feet deep, so that in the year 1655 Admiral Blake could very comfortably anchor there, with his naval force, composed of nine men-of-war. At present, the Porto Farina has a depth of hardly two feet, and the time is not far distant when the whole bay will be joined to the continent. Again, the celebrated city of Utica, which, under the Carthaginians, possessed a splendid port, is now converted into a large sandy plain, whereas the ruins of the once littoral city are more than twelve miles distant from the sea. There are few places in the world which offer a more melancholy contrast between the present and the past than this sandy, perfectly shadeless plain, which I crossed under the scorching African June sun, without meeting a single living creature of any kind. I had become familiarised with similar phenomena in the classic regions of Asia Minor, where not only men, but also nature, have for so many centuries practised the work of destruction. But if nature destroys she equally creates, and in a topographical sense, Asia Minor offers, on that account, the most striking examples. During the ten years I devoted to the exploration of that magnificent country, I was able—the ancient geographers and historians in my hand—to ascertain the modifications which the surface of this country has undergone, since the Christian era only. Those modifications are so considerable, that taking into account the increase of solid land, produced only by the formation of large river deltas, and the filling up of seas and gulfs, it can be said, without exaggeration, that the surface of Asia Minor has conquered, during this comparatively short time, the amount of a little province, a kind of conquest which is still rapidly continuing, so that one day may be realised the prophecy of Strabo, who, eighteen centuries ago, declared that the time would come when the shores of Cilicia may reach the island of Cyprus, an event likely to give great trouble to diplomatists, if such functionaries are then still existing.

To these remarks on the different physical changes undergone by the Sahara-Lybian desert and the Mediterranean regions during the latest geological periods, and even historical times, I may add a few words regarding certain botanical changes, which probably took place after the formation of the Mediterranean Sea, considered by several naturalists as comparatively recent. The fact is, that the two shores of this sea present a great difference in the amount and the distribution of certain families of plants, a difference which climatic conditions are not sufficient to explain. Among those vegetable families I will quote only the Cupuliferae and the Coniferae. In the first, the genus *Quercus*, or oak, is particularly conspicuous on that account. In geological respect the oak may be considered as of recent origin, for among the thirty-four fossil species admitted by Count Saporta, all, with the exception of one only (*Quercus primordialix*), appear for the first time, as late as the more recent tertiary formations (miocene and pliocene). Now, Algeria has hardly nine species of oak, but Spain has sixteen species, France twelve, and Greece probably beyond fifteen; whereas Asia Minor, where this genus seems to have acquired its maximum of development, has fifty-two species, of which twenty-six are peculiar to the Anatolian peninsula.*

As for the family of Coniferae, the cedar presents a striking example of localisation, for, on the whole Mediterranean coast-line, there are only four points where this beautiful tree grows truly wild, viz. the Lebanon (Syria), Algeria, Cilicia (southern Asia Minor), and Cyprus; the existence of the cedar in the last-named island having been recently ascertained by Sir Samuel Baker. The Lebanon had been considered as the cradle of the cedar, before North Africa was known to contain large forests of a variety of that species (*Cedrus Libani* var. *atlantica*), but the Austrian botanist

* Tchihatchef, 'Asie Mineure, partie botanique,' ii. pp. 463-80.

Kotchy, and myself, were so fortunate as to discover in Cilicia a new station for this fine tree, much more important than any one known previously, as I believe I have proved,* comparing the Algerian cedar forests with the Anatolian ones, so that if these last had been known when the botanist Loudon established the new species of cedar, he would have called it *Cedrus Ciliciae* instead of *Cedrus Libani*.

The two instances of curious localisation, which I have just alluded to, are sufficient to prove that such phenomena took place *after* the formation of the Mediterranean Sea; for had the cedar been spread out on the continent, which once united Europe to Africa, this tree must have remained, after the separation of the two continents, on many points of the northern shores of the Mediterranean, as, for instance, on the mountains of Greece, on the Apennines, the Pyrenees, &c., where the conditions of climate and soil are as favourable to the cedar as they are in North Africa, Asia Minor, or on the Lebanon; whereas, if we admit that the cedar appeared on its present stations, after the formation of the Mediterranean, the impediments opposed by the sea to the diffusion of the tree on both sides of the Mediterranean, account sufficiently for its localisation.

A similar reasoning may be applied to the absence of monkeys on the northern shores of the Mediterranean, and their abundance on the southern. It is known that the only point in Europe inhabited by wild monkeys is the rock of Gibraltar; still they are there by no means indigenous, but most probably have been imported by the Arabs during their long domination of Spain, so that had this interesting colony not been artificially maintained, there would be now-a-days not a single monkey on this rock; the fact is, that in 1856 they had almost entirely disappeared, when Sir William Codrington caused a new importation to be made from northern Africa. Like the cedar, the monkeys of Gibraltar, belonging to the same species (*Macacus Inuus*) as that of Algeria, would be found now as indigenous inhabitants on many shores of Greece, Italy, Spain, &c., had they existed before the separation of Europe from Africa. An additional proof of the recent immigration of the monkey is, that the quaternary fauna of the caves of Gibraltar, so carefully studied by English geologists (Busk, Smith, Leith Adams, &c.), has not yielded any remains of quadrumana; and A. R. Wallace admits,† that even in the Miocene epoch, monkeys as well as the large mammals now characteristic of Africa (lion, elephant, hyena, rhinoceros, hippopotamus, &c.) were spread over Central Europe, but did not yet inhabit Africa, into which they migrated at a comparatively recent time.

Let us now resume, in a few words, the most prominent features of the geological history of the Sahara-Lybian desert.

1. The records of this history are very old, for the southern regions of the present Sahara were represented during the Devonian period by a certain number of isolated masses of limestone, gneiss, and mica-schist, the limestone containing Devonian fossils. Those masses preserved through all the succeeding ages their insular position, and never sank again under the sea.

2. It was during the cretaceous epoch that a large portion of the present Sahara was upheaved in the shape of variously ramified masses, so that the sea of the following geological periods could penetrate into their interior, forming numerous gulfs and bays.

3. The Sahara was represented down to the quaternary epoch chiefly by those cretaceous masses which since their upheaval have never been covered by the sea. During the quaternary period, among the gulfs which washed the shores of the

* In my 'Espagne, Algérie et Tunisie,' p. 78.

† 'Quart. Journ. Geol. Soc.,' an. 1878, xxxiv. p. 34.

cretaceous land, the largest occupied the present country of Igharghar; the northern extremity of that gulf reached the place of Biskra, and the southern the cretaceous plateau of Tademayt and Tinghert; the town Uargla occupying almost the central part of the gulf. As the last was entirely secluded from any communication with the sea from the north, the littoral part of Algeria having been upraised long time before, and consisting then, as now, of more or less high mountains, the large quaternary gulf could find no other way into the interior of the Saharian cretaceous continent than by the present gulf of Gabès; and that here was really the entrance of the quaternary gulf, is proved by the narrow strip of diluvial deposits which, surrounded by cretaceous rocks, extends from Gabès to the salt lake of El-Fedjedj (*Tritonis lacus*). This geological fact is important in reference to the question, so long discussed, of the ancient communication between the lake and the sea; it confirms the hypothesis of Commander Roudaire, and I am not aware that this argument, which I consider as the strongest of all, has ever been urged in his favour. The upheaval of the large quaternary gulf (and of many other smaller ones) was the last marine phasis which the Sahara underwent.

4. Once entirely raised up in all its parts, the Sahara had still to undergo a sub-aerial operation which consisted in the formation and accumulation of sands. It closes the fourth and last stage of her long geological history, without speaking of the different climatic and topographical modifications of quite recent times. This history, as it has been shown, proves that there can be no longer question of a recent emergence of the whole Sahara from the bottom of the sea. It is true the Lybian desert is probably somewhat younger than her Saharian sister, for tertiary uncovered deposits (eocene and miocene) have there a larger development than the cretaceous strata; but, even admitting that the Lybian desert has been upraised since the Miocene period, it cannot be called recent.

I have space only for a few words about the Turkistan deserts and the Gobi.

The two largest deserts of Turkistan are situated between the Syr Daria (*Jaxartes*) and the Caspian Sea, in the average, under the 45th and 48th degrees of northern latitude, and consequently under the parallel of North Italy and Switzerland. The one—the most eastern—is named Kizyl-Kum (signifying in Turkish red sand), is included between the Syr Daria and the Amu Daria (*Oxus*); it is limited on the north-west by the Aral Sea, and extends in the southern direction as far as Bokhara, having from north to south a length of about 400 miles, and from east to west about 300. The other desert, almost of the same development, is situated between the Amu Daria and the Caspian Sea, and extends from the country of Khiva to near that of Merv; the Turkomans generally call it Kara-Kum (black sand).

Unfortunately I have not visited myself those two deserts during my long rambles in the East, and I am not aware of anything being known with regard to their geological constitution. A short notice, however, published about them in Petermann's 'Geographische Mittheilungen' * contains a few facts which may throw some little light on the subject. The sands which cover certain parts of the desert are reported to include shells of molluscs still living in the Aral Sea, but where sands are wanting, clay-slates (*Thonschiefer*) form perfectly uncovered surfaces. Very good water is found everywhere under the sand at a depth of less than a foot, but it is reached only at two to four fathoms in the clay-slates, and is briny and bitter; this difference seems to prove that the sands contain much less salt than the clay-slate, probably because the salt spread about among the light quartz particles is more easily diluted by the atmospheric waters than the salt contained in the compact rock of clay-slate.

* 'Petermann's Mittheilungen,' 1878, xxiv. p. 293.

It is most probable that this clay-slate belongs to the Palaeozoic epoch, and that consequently the two Turkistan deserts were upraised at a very ancient geographical period. As for the sands containing remnants of molluscs still inhabiting the Aral Sea, they may have been, partly at least, deposited at a time when the Caspian and Aral formed a single sheet of water.

In the whole steppe designated by the collective name of Khirgis Steppe, of which the Kyzil-Kum and the Kara-Kum form only a part, the climate offers the most violent contrasts. The heat begins in May, when the temperature rises beyond 122 degrees (50° Centigrade); and it is under this high temperature that many of the plants peculiar to the sandy and salt soil—as, for instance, the *Alhagi camelorum*—give to the desert a certain green appearance. In spring the hot days are followed by cold nights, so that the difference between the mean temperatures of day and night is enormous. In summer this difference is not so great, in consequence of the intense heat of the sand. Dew has never been observed. In the middle of September begin the long night frosts. In January the thermometer falls 36 degrees below zero Fahrenheit (— 38° Centigrade), but there is little snow. In general, the climatic contrasts between the Turkistan deserts and the French Sahara are much stronger than the differences between their respective latitudes would lead us to expect. Thus, for instance, there is about 12 degrees difference between the latitude of Biskra and that of the Turkistan deserts, and still, at Biskra frost is almost unknown, the mean annual temperature being 70 degrees.

Now, if from the Turkistan deserts we direct our steps further east, we reach the long chain of mountains which separate Siberia from Central Asia, a chain composed of the mountain groups collectively called Altaï, Sayan, and Yablonovoi, the two first of which I have visited, but without crossing them, or descending into the desert of Gobi. This immense desert—the largest in the world after the Sahara—begins almost immediately at the southern foot of the just mentioned Siberian mountain range, and extends to the south as far as the chain of Kuen-lun and its eastern ramifications, having from north to south about 1800 miles, and about 4000 miles from east to west—viz. from the mountainous chain of Changan to the country of Yarkand. The geographical position of the Gobi desert is, in the average, between the 35th and 45th degrees of northern latitude, and consequently almost under the latitude of Italy—a fact rendering still more remarkable the climate of the desert, which exemplifies in a most extraordinary way, and even more than in the Turkistan deserts, the influence of eastern longitudes, combined with the powerful radiation of large, more or less flat, surfaces; for though under the latitude of Italy, but about 40 degrees more to the east, the Gobi offers the strongest contrasts between the seasons: the summer reminding one of tropical heat, and the winter of the cold of the polar regions, and that not only on account of its intensity, but also its duration—a fact of which Colonel Prejevalski gives us the following striking example:—In the mountainous tract of Gansu, at a height of not much more than 3000 feet, on May 16th, the thermometer indicated 24·80° Fahr. (— 4° Centigrade), and on May 28, snow falling copiously formed on the soil a coating 5½ inches (16 centimètres) thick, and the thermometer sank to 22·46° (— 5·3 Centigrade).

As Prejevalsky, the distinguished Russian traveller, has seen more of the Gobi desert than any of his predecessors, I beg leave to quote his own words, which give a graphic portrait of the desert*: “The general impression produced by the Gobi on the traveller has something gloomy and oppressive. During whole weeks the eyes repose on the same objects: unlimited yellow-coloured plains, furrowed rocks or steep hills, on the top of which one perceives sometimes the flying form of the

* Prejevalski, ‘Reisen in der Mongolei,’ 2te Auflage, p. 15.

antelope (*Antelope gutturosa*). The heavily laden camels cross, with measured solemn steps, hundreds and hundreds of miles, and still the desert does not change, keeping always its stern and monotonous appearance. The sun sets, the dark shadows of the night fall, the cloudless sky lights its million of stars, and the caravan stops. Happy to get rid of their loads, the camels lie down around the tents, and their drivers are occupied in preparing a frugal meal. One hour more, and men and animals are soundly asleep, and all around reigns the deadly silence of the desert, as if no living creature were present. Across the whole of the Gobi, from Urga (near the Siberian frontier) to Kalgan (near the frontier of China), there are, except the great post road maintained by the Mongols, several other routes which are usually followed by the caravans carrying tea. Along the post road are stations erected at certain distances, the total number of which amounts to forty-seven, and each of which is provided with a well and with a certain number of Mongol tents (*yurt*), which represent our post-houses."

This long post-road between Urga, Kalgan, and Peking was, during a long time, the only way by which travellers used to cross the Gobi in its whole breadth from north to south. But in the numerous published travels, nothing is mentioned except the immense sand-accumulations, and no reference made to the solid rocks on which these sands repose, or to any organic remains. It seems, in fact, that this monotonous road does not offer any interest whatever, for even the sharp-sighted Colonel Prejevalski was not able to detect anything of scientific importance; all he says of the country between Urga and the frontier of China is, that the soil of the Gobi consists of reddish, coarse-grained sand and pebbles belonging to different rocks. Fortunately, on his return journey, he did not follow the trodden road from Peking to Urga, but took a much more western route, so that he crossed the desert in a direction in which it had never been previously visited, viz. from the mountains of Alashan to Urga. He describes this part of the desert as a very undulated surface, and at certain points intersected by considerable heights composed chiefly of porphyry. In a depression he observed gneiss cropping out through the superficial deposits, and here and there this rock rising like little islands amidst the sea of sand.

Such exposures of the substratum are of the greatest importance to our knowledge of the solid framework of the desert; for if we could ascertain that the rocks cropping out through the sand do not differ geologically from those which compose the border mountains of the desert, we should be induced to conclude that the one is merely a continuation of the other. Therefore let us cast a glance on the mountains which form the boundaries of the desert, beginning with the northern or Siberian side.

Here, I have been able myself to ascertain the Palæozoic age of the Altaï and Sayan ranges,* which consist chiefly of clay-slate, limestone, porphyry, &c., and it is probable that the Yablonovoi chain, which is an eastern continuation of the Sayan, belongs equally to the same age.

The latest explorations of the Thian-Shan, or celestial range, the various ramifications of which form the southern and western boundary of the Gobi, tend also to prove that they are referable to an old geological formation. Colonel Prejevalski, who crossed more than once the mountains of the south-eastern part of this boundary, mentions as the chief rocks composing them, granite, syenite, granulite, porphyry, diorite, mica-schist, clay-slate (*Thonschiefer*), chloritic schist, and coal deposits. These are the geological elements which, according to Colonel

* P. de Tchihatchef, 'Voyage Scientifique dans l'Altaï oriental et les parties adjacentes de la Chine.'

Prejevalski, constitute many of the marginal mountain ranges which he visited between Kalgan and the lake Kuku-Nor. He mentions very extensive coal deposits in the mountains of Alashan, rising beyond 10,000 feet, as well as in the mountains which in Northern Tibet form the eastern boundary of the Kuku-Nor. These facts prove that the mountain range representing the south-eastern boundary of the Gobi (from Kalgan to the Kuku-Nor) are composed of rocks which very likely belong to ancient geological formations.

A similar conclusion may be applied, with great probability, to the long chain of Chingan, which may be considered as the eastern boundary of the Gobi, and separates Mongolia from Manchuria; for this chain is intimately connected with the mountains of Inshan, one of the south-eastern marginal mountains of the Gobi, which Colonel Prejevalski found to be composed of granite. At all events, all those mountains may be considered as the eastern extremity of the long chain of Kuen-lun, which, according to Baron von Richthofen, is the largest and altogether the *oldest* mountain-chain of Asia.

We have, consequently, no lack of arguments in favour of a very ancient formation of the Gobi, and we may admit that at the time when the mountains which surround the desert were upraised, the immense space included in the interior precinct remained much lower, but still sufficiently high to form one of the loftiest tablelands of the world, the average height of which, Colonel Prejevalski estimates to be near 4000 feet (1285 metres), with local depressions sinking to about 3000 feet.

It is, therefore, probable that after its upheaval, this large surface has never been submerged by the sea, as little as the Sahara-Lybian desert since the cretaceous and tertiary periods, or the Turkistan deserts since the Palaeozoic epoch. Once more, in the Gobi, as in the other two deserts, the sand-accumulations had nothing to do with marine deposits; they were chiefly produced by atmospheric agencies, and as far as the Gobi is concerned, the frequent siliceous rocks, as granite, syenite, gneiss, &c., were particularly fitted to yield sufficient materials for the formation of quartz sands.

After all I have said, it is superfluous to add that the upheaval of those deserts did not take place at once, but successively, as we have seen in the Sahara-Lybian desert, where the cretaceous and tertiary rocks appeared, the one after the other, leaving large tracts still occupied by sea- or fresh-water basins, which were filled up only during the quaternary epoch, or even in more recent times. Therefore it is highly probable that, like the Sahara-Lybian desert, the Asiatic deserts were also penetrated, long after the upheaval of their chief portions, by gulfs, or contained numerous fresh-water basins—a supposition which, in reference to the Gobi, is supported by the interesting considerations of E. Regel, on the character of the flora of Central Asia.*

On the Identification of Certain Ancient Diamond Mines in India.—By Professor V. BALL, M.A., F.R.S., F.G.S.—The vague references to India as the only then known source of diamonds by the writers of 2000 years ago, give place to more definite indications of position in Sanskrit works of the sixth century, and possibly of somewhat earlier dates. In the *Barhat Sanita* a list of localities is given, but as the stones from some of the localities therein mentioned were copper coloured, it is possible that they were not diamonds. In the *Ain-i-Akbari* (1590), and also less clearly in *Ferishta's History* (1425), a locality named *Albeniguras* is referred to, which can be identified with *Wairugurh* in the Central Provinces, where the remains of ancient mines are still to be seen. The following localities mentioned by *Tavernier* (1665) had not been identified until lately, though various attempts had been made

* *Vide* 'Petermann's Mittheilungen,' 1882, xxviii. p. 65.

by Colonel Rennell and others since his time :—Gani or Coulour is Kollur on the Kistna; Raolconda is Ramulkota in Karnul; Soumelpour was on the Koel river in the Palamow district of Bengal.

Kollur would appear from Tavernier's statement to have been the mine where the Great Mogul diamond was found. The same stone is mentioned by Garcias ab Horto, who wrote 100 years before Tavernier. Professor Ball is of opinion that this stone, which was probably found in the middle of the sixteenth century, was the original of the Koh-i-nur. The author referred to several other early authorities, and to the mythical stories which are connected with the accounts of diamond mining, for the origin of which he proposed explanations.

The Geography and Meteorology of Kansas. By LITTON FORBES, M.D., F.R.G.S.—The author, who had had large personal experience in Kansas and Colorado, desired to point out some facts in the geography and meteorology of Western Kansas, which, perhaps, had not received all the attention they deserved. The physical conditions of this State, the most central of the Union, were in many respects peculiar. It was a land of undulating plains, almost as flat to the eye as Holland or Egypt. Its watercourses, its soil, and above all its climate, presented many points of interest. It would be perhaps impossible to find a country of equal extent where the physical changes produced by the advent of civilisation have been so numerous and so important. Not only has the fauna been in great part changed, but the flora also, as well as the amount of rainfall, and the general hygrometric conditions of the atmosphere. Not merely has the number of inches of annual rainfall increased, but it has also been more equably extended over a larger extent of country. The procession westward of the rainfall of Kansas in proportion as settlement has extended westward, is a most important fact. It may be due in part to the planting of timber, but is probably much more directly dependent on the immense acreage under wheat, indian-corn, and other crops, which afford protection to the earth from the sun's rays, and so check a too rapid evaporation. A careful study of the changes wrought in the climate of Kansas by settlement might possibly aid in the solution of certain problems which have long presented themselves in some of the southern colonies of Great Britain. Many parts of South Australia and New South Wales very much resemble Western Kansas in soil and climate. Those countries have hitherto been considered as possessing too little moisture for agriculture, and as therefore fit only for grazing purposes. The same was said of Kansas some twenty years ago, but within that time very marked climatic changes have taken place. What settlement has effected in Kansas, it may equally well effect in Australia, with similarly beneficial results. The State of Kansas forms a rectangular parallelogram, which measures about 400 miles from east to west, and about 200 from north to south, and contains over 82,000 square miles. Though to the eye apparently one vast level plain, it is really a more or less elevated plateau, which slopes eastwards at an appreciable angle. The highest, or western portion of the State is about 4000 feet above the level of the sea, while the average height of the whole country may be placed at about 2375 feet. The main watercourse is the Arkansas river, which has a fall of about six feet in the mile. In spite of the absence of hills, Kansas is singularly free from marshland or swamps. This is due in part to the friable nature of the soil, and in part to the natural slope of the land towards the east. What is known as the "Great Arkansas Valley of South-Western Kansas," embraces a width of 50 miles, nearly the whole of which is sloping upland. The soil here is a sandy loam, of alluvial origin, and of great depth and fertility. A remarkable peculiarity of the Arkansas river is that it never overflows its banks, but, so to say, underflows them. The water filters through the gravelly stratum underlying the surface-soil of the valley, and may always be

averaging between one and two thousand yards in its lower waters, and, despite the existence of sandbanks, navigation can with ordinary care be carried on in perfect safety. From Manghas, where navigation stops, Yunnanfu, the principal town and the seat of government in Yunnan, is distant only eight days' journey; and the road presents neither any striking features of interest nor any obstacles to the conveyance of merchandise. At Manghas, M. Dupuis found an energetic mercantile community, and he was able to conclude a very satisfactory arrangement with the principal Chinese merchant of the place. As the terminus of the river traffic, Manghas is likely to become a town of commercial importance, and one of which we shall hear much in the future. The development of commerce with the peoples of Tongkin and Cochin China is a matter that will exclusively appertain to the French; but the Songkoi route promises to possess a more than local importance. There can be no doubt that in it the French possess the best and the easiest road into Yunnan; and for the present the Chinese authorities appear more disposed than they usually are to simplify the way for foreign trade. Of this it is not difficult to see a potent reason in the remoteness of the province from the centre of their power—a fact which has repeatedly proved the cause of the temporary severance of that province from the rest of the empire. During the height of the Panthay rebellion the Chinese generals in Yunnan received most timely assistance by means of the supply of arms brought them through Tongkin by M. Dupuis, and they doubtless anticipate being able to derive some similar advantages from this route in the future. Without attempting to prophesy on the subject, it may be asserted that one of the best consequences of French activity in the Indo-Chinese peninsula will be to quicken the question of establishing land communications between British Burmah and India on the one hand and China on the other. But unless the French are more apathetic than seems likely, the route by the Songkoi is destined to be the most important route into Yunnan during the immediate future.

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On some unexplored or little known parts of Persia. By Colonel Sir OLIVER ST. JOHN, R.E., K.C.S.I.

On the various Means of Commercial Communication between Central Persia and the Sea. By Colonel J. V. BATEMAN CHAMPAIN, R.E.—(Will be published, with map, in a subsequent number.)

their influence in the Indo-Chinese peninsula; and by a series of events which do not call for minute description they have now established their virtual supremacy throughout Tongkin (Tonquin) up to the immediate borders of the Chinese Empire. In the course of these operations a very considerable amount of geographical information has been collected and carefully arranged; and the experience of M. Dupuis, the principal explorer in this region, appears likely to exercise a great influence not only on the development of events in the dominions of Annam, but also on the progress made towards unrestricted communications with the great Chinese province of Yunnan. The results of M. Dupuis's journeys demand our close attention, and it is the object of this paper to present a brief summary of them. In the first place it may, however, be useful to give a few facts in connection with the position of the French in this part of Asia. In the year 1787 the Court of Hué ceded to France the peninsula of Tourane, and the small island of Palo Condore, but no active measures were ever sanctioned towards taking possession of these places. Tourane, it may be stated, is situated only a short distance from Hué, and Palo Condore lies off the entrance to the Mekong. It was not until the Anglo-French expedition to Peking called increased attention to events in the far east that the Paris authorities bethought them of the territory they had long ago obtained on the brink of the China Sea. The murder of a French subject, M. Diaz, supplied an excuse for diplomatic action. A first treaty was concluded in 1862, and the French exchanged their nominal possessions for the more advantageous settlement at the mouth of the Mekong or Cambodia, now known as Saigon. From that time to the present the growth of French dominion has been steady and continuous. In 1874 a further treaty was signed for the purpose of declaring Tongkin open to the commerce of Europe; but the hostility of the people, the treachery of their rulers, and the disturbed state of the northern districts of the country combined to prevent this instrument possessing any force until a few months ago when a French expedition established itself at Hanoi, or Kesho, the capital of Tongkin. Not until the French Government took this decided step did the full significance of the previous ten years' explorations of M. Dupuis become apparent, for it was only on the guarantee of security that his suggestions could be carried into practice.

The immediate importance of Tongkin consists in the possession of a water route from the sea for a distance of three hundred miles into the interior up to the immediate borders of Yunnan. The river Songkoi, or the Red River, was first explored by M. Dupuis, and to him belongs the honourable distinction of having discovered and demonstrated its navigability. His successive journeys up its course into Yunnan, on the first occasion when the Panthay rebellion was in full swing and on the second after it had been sternly and effectually suppressed by the Chinese, furnished the clearest proof of this fact, which has now been further demonstrated by the presence of French vessels of war at Hanoi. The most important question we have to consider is, what are the special advantages possessed by the Songkoi route for reaching Yunnan and the south-west of China? In the first place, M. Dupuis established the navigability of the river from each of its three mouths to a town 300 miles up its course, named Manghas. Hanoi, the chief town, is about 80 miles from the sea; but the authority of Annam does not extend further up the stream than Kwense, a village less than 100 miles distant from Hanoi. Beyond Kwense, until the Chinese outposts are reached, the robber bands of the black and yellow flags hold possession of the river banks and surrounding country. There is still some uncertainty as to the best channel by which the capital should be approached from the sea, and opinions differ as to the relative merits of the Balat and Songchi channels, and the Cam canal. They each appear to have their advantages, and to supplement the deficiencies of the others. The river is very wide,

averaging between one and two thousand yards in its lower waters, and, despite the existence of sandbanks, navigation can with ordinary care be carried on in perfect safety. From Manghas, where navigation stops, Yunnanfu, the principal town and the seat of government in Yunnan, is distant only eight days' journey; and the road presents neither any striking features of interest nor any obstacles to the conveyance of merchandise. At Manghas, M. Dupuis found an energetic mercantile community, and he was able to conclude a very satisfactory arrangement with the principal Chinese merchant of the place. As the terminus of the river traffic, Manghas is likely to become a town of commercial importance, and one of which we shall hear much in the future. The development of commerce with the peoples of Tongkin and Cochin China is a matter that will exclusively appertain to the French; but the Songkoi route promises to possess a more than local importance. There can be no doubt that in it the French possess the best and the easiest road into Yunnan; and for the present the Chinese authorities appear more disposed than they usually are to simplify the way for foreign trade. Of this it is not difficult to see a potent reason in the remoteness of the province from the centre of their power—a fact which has repeatedly proved the cause of the temporary severance of that province from the rest of the empire. During the height of the Panthay rebellion the Chinese generals in Yunnan received most timely assistance by means of the supply of arms brought them through Tongkin by M. Dupuis, and they doubtless anticipate being able to derive some similar advantages from this route in the future. Without attempting to prophesy on the subject, it may be asserted that one of the best consequences of French activity in the Indo-Chinese peninsula will be to quicken the question of establishing land communications between British Burmah and India on the one hand and China on the other. But unless the French are more apathetic than seems likely, the route by the Songkoi is destined to be the most important route into Yunnan during the immediate future.

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NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Penck, Albrecht.—Die Vergletscherung der Deutschen Alpen, ihre Ursachen, periodische Wiederkehr, und ihr Einfluss auf die Bodengestaltung. Leipzig (J. A. Barth): 1882, 8vo., pp. viii. and 488, maps, plates, and tables. (*Williams & Norgate*: price 12s.)

This contribution to the literature of physical geography was awarded the prize offered by the Philosophical Faculty of the Ludwig-Maximilian University at Munich for the best treatise containing a thorough description of the diluvial glacial-formations and phenomena in the South Bavarian plateau and Bavarian Alps.

After an introductory sketch of the history of Glacial geology, the author divides his work into three sections, respectively discussing recent and ancient glacial action in Upper Bavaria and North Tyrol, and the formation of the Upper Bavarian lakes. The first section describes immediate and indirect glacial action, the former comprising (besides various chapters of local details) an orographic sketch of the region of glacial formation in South Bavaria, and the historical development deduced therefrom, with a discussion of the connection between surface formation and glacier distribution on the Bavarian plateau.

The maps are (scale 1:1,250,000) of South Bavaria, with special reference to ice phenomena, and a small north and south pole projection of the World, showing former and existing glacier-regions.

ASIA.

Stack, Edward.—Six Months in Persia. London (Sampson Low and Co.): 1882, 2 vols., sm. 8vo., pp. 294 and 319, maps. Price 24s.

The author, a member of the Bengal Civil Service, here gives in diary form the narrative of his journey across Persia from Bushire to the Caspian, on his way to England from Bareilly, N.W. Provinces; and the length of time occupied on the road (February to August 1881), added to the number of places visited, has enabled him to give a very readable account not only of the Persian life of to-day, but of the physical aspects of the country traversed. More than usual attention is paid to geography in his work, which contains no less than seven maps (though no list of them is given, there being moreover no Introduction or Index, and only a list of chapter headings, often one word alone), viz.:—a general map of Persia (scale 145 miles to the inch), and Shiráz to Lár, Lár to Karmán, Karmán to Yazd, Yazd to Isfahán, Isfahán to Tehrán, and Tehrán to the Caspian (all on the scale of 16 miles to the inch). These maps sufficiently indicate the author's route.

A special geographical chapter is also given, in which Mr. Stack supplies omissions or corrects errors in St. John's large map of Persia, now accepted as the standard authority, and on which his own maps are based. These details occupy seventeen pages, and can hardly fail to be of great value, especially as some parts of the route (e.g. from Lár northwards to Forg) are in hitherto unexplored country.

From Karmán to Yazd, Mr. Stack followed the route *viâ* Bafk to the north-east of that by which Mr. Floyer travelled, keeping also at times a trifle more to the north on the road thence to Isfahán, from which city he struck south-west to the Kallar Koh (probably an extension of the Zarda Koh), then turning north-west and north. The "Daulatabad" to which he refers as "a mere village fort with a few fields" on the road northwards from Gulpáigan to Kum, must not be confounded with the town of the same name mentioned by Mr. Floyer, situated about 100 miles further west.

The author gives an account of his ascent of Damavand with Captain Wells, and of his journey home by the Caspian and through Russia, and concludes his work with some lengthy notes on the Land-revenue system of parts of Southern and Central Persia, some remarks on the present condition of the kingdom, and practical hints on travelling there (in the course of which he suggests some half-dozen routes which would materially add to our geographical knowledge).

AMERICA.

Billingshurst, Guillermo, E.—*Reconocimiento Militar del Río Desaguadero y de la Altaplanicie Andina.* Lima (Imprenta de "La Patria"): 1880, 8vo., pp. xliii., 210, and appendices, plate.

Colonel Wm. E. Billingshurst, Chief of the General Staff of the Peruvian army, was in the course of the operations of the war between Peru and Chile commissioned by his government to make an examination for military purposes of the navigability of the river Desaguadero, the sole outlet of Lake Titicaca, which flows in a southerly direction through the Bolivian provinces of Ingavi, Sicasica, Oruro, and Páris, finally emptying itself into Lake Poopo or Pampa Aullagas, the "Panza" of D'Orbigny and still so called by the natives, who sometimes also call it the Lake of "Choro," from the islet at the mouth of the river. This river, which was not thought to be navigable, has hitherto been explored only in a desultory manner by Don Rómulo Espinar and Mr. Daniel "Yocham" ("Yokeham," according to Musters), neither of whom went beyond Ulloma, some 35 miles from the lake. Colonel Billingshurst, however, has succeeded in tracing the main course of the stream, and in navigating it through its entire length; and he has forwarded to the Society a copy of his official report containing the notes taken during his expedition, and also a MS. map of the river made during the voyage.

The report, after some professional introductory correspondence, contains a general description of the elevated plateau of Bolivia, with sketches of its geology, climate, products, and political divisions, the department of La Paz being briefly noticed by itself, followed by a special and more lengthy account of the department of Oruro, of which the component provinces of Omasuyos, Pacajes, Sicasica, Oruro, Páris, Carangas, and part of Lipez are separately treated. Roads and projected railways are then discussed, with topographical details, levels and gradients, and suggestions for telegraph routes; and after some notes on the present state of the Aymará race, &c., minute particulars of Colonel Billingshurst's journey are given in diary form.

Starting from Atico on 3rd Feb., 1880, he reached Arequipa on the 12th, and Puno on Lake Titicaca on the 21st, from which point various excursions by land and water were made, and Desaguadero at the southern end of the lake was reached on the 2nd March.

The real work of the expedition (which consisted of a steam launch, a flat-bottomed boat, and raft) then commenced, and on 4th March the river Desaguadero was entered, the difficulties of discovering its navigable channels being much increased by the great quantity of water-weeds ("liaicho" and "lacco") which fouled the screw and otherwise impeded progress. The river at first forms a small strait between Sojapaca and Quelcata, at the former of which points the steadily declining race of Urus or Uros live; they are exclusively devoted to fishing and hunting, being perfectly acquainted with the river and lake, and, though they have a special dialect, understand Aymará. After passing this strait, the most noteworthy point during the exploration was observed, the river suddenly opening out right and left at a point called Huintuncane on the Bolivian shore to such an extent as to form a second lake, to which the name of "Lago del Totora" was given, from its being covered with a vegetable growth of totora of large size. This lacustrine enlargement is about 18 miles from north to south, and 5 miles from east to west; its depth being never less than 6 feet until within a mile and a half of Ancoacqui, near its southern extremity. The totora grows at the bottom, and rises some feet above the surface, beginning at Huintuncane to form as it were a large forest, traversed by numerous paths which afford channels of passage: all kinds of

birds found on the lake (including *Phenicopterus andinus*) nest in it, and it affords shelter also to small rodents, being so dense in growth indeed that the Indians twist it into huts above the surface of the water to cover them during their fishing operations. It was also used during the expedition for making a raft to lay out a kedge. When it turns yellow, the Indians set fire to it to procure a new growth. No clue is given to the botanical identification of this plant, which is so suggestive of the "ambatch" of the Nile region. It is called "the great Titicaca rush" by Forbes, in his paper on the Aymará Indians in the *Journal of the Ethnological Society* (n. s.) vol. ii., 1870, p. 193 *et seq.*, who describes floating bridges used for the passage of the river by animals and men, formed of bundles of this plant. One of these bridges is figured by Squier, in his 'Peru' (Macmillan, 1877), p. 309, who describes Billingham's "Lago del Totoral" as "totorales," a series of shallow lakes or marshes full of reeds, and quotes Herrera's reference to the Uros as actually living on floating towns of totora; and in Orton's 'Andes and Amazon' there is (p. 429) a picture of the navigation by means of the "balsa" or raft made of the plant.

At Ancoacqui, the shallowness of the water (caused by the want of rain for the past three years) and the increasing quantity of weed prevented the further progress of the steam launch, which was sent back to Desaguadero, the expedition continuing with the boats. After passing a small affluent called the Llingue (the third on the western bank, the first being the Hiscamaure, a league south of Sojapaca, and the second the Callacama, the divisional line between Bolivia and Peru, another league further south), the Desaguadero resumes its riverine form, which it retains until entering Lake Poopo, a distance of 84 leagues in all. Many small affluents were observed on both sides of the river, and one large feeder, the Mauri, on the western bank below Concordia, which has no less than 8 mouths, rendering navigation difficult.

Above Ulloma, the river widens out very considerably, and the channel practically disappears, in consequence of the formation of great sandbanks. Callapa, San Juanillo, Cumu, and Roque Balsa, the port of Challacollo (which is four leagues by road from Oruro), are the chief points below Ulloma, before arriving at the sandy island of Choro, which is practically formed by the emptying of the Desaguadero into Lake Poopo. The lake was reached on 23rd March by the expedition, and found to be 11,850 feet above sea-level. Any attempt to navigate it was out of the question with the imperfect means at Colonel Billingham's disposal, but he adds a description of it, mainly resulting from the surveys of Don Epifanio Aramayo, after giving a sketch of Titicaca, and a note by Pedro Sieveking on the carboniferous deposits of Puno. In this description of Lake Poopo, the interesting question of its subterranean outlet is thus briefly discussed:—"The river "Laca-ahuira" (mouth of the river), also known by the name of the "Desaguadero," issues from the lake, and flows in a westerly direction, losing itself at the distance of a league, to form eventually the lagoon of Coipasa. This latter does not strictly deserve the name of lake, as it is only an extensive and somewhat marshy plain, covered with saline efflorescences which almost follow the exact level of its outline. It appears a fact that the waters collect in it in order to run by a subterraneous passage to the Pampa of Tamarugal, and thence to the ocean.

A discussion of the navigation of the Titicaca Desaguadero and details of the various routes conclude the volume.

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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Notes on the Oldest Records of the Sea-route to China from Western Asia. By Colonel H. YULE, C.B., R.E.*

THE purpose of this paper is to review, as concisely as may be practicable, the geography of the most ancient sea-trade with China, and to set forth the persistence of the maritime tradition of the route to that country during the first nine or ten centuries of the Christian era. In the bulk of its detail this paper has little pretension to originality. I have myself at various times given attention to the subject, and have elaborated parts of it; but I shall make use of any books or papers which appear to me to contribute sound views, as well as of my own. I do not know of any work that treats the whole subject precisely as I propose to do.

The chief original sources of information are the following:—

1. The anonymous *Periplus of the Erythrean Sea*, the date of which we shall assume, after Dr. Carl Müller, to be about A.D. 80–90.
2. Ptolemy's *Geographical Tables*, dating about A.D. 150, and his extracts from *Marinus of Tyre*. The latter derived, apparently, a main part of his information regarding the sea-voyage, from a navigator or trader of the name of Alexander, whose date may be put conjecturally about A.D. 100.
3. The '*Topographia Christiana*' of Cosmas, c. A.D. 545.
4. The *Arab Geography* of Ibn Khordādbah in the first half of the ninth century; and the first part of the Arabic notices of India and China, last translated by M. Reinaud, dating from A.D. 851; supplemented to some extent by the work of Mas'ūdi (c. 930–940).

The earliest of these writers, the author of the *Periplus*, knows *Thin*, of which *Thinai* was the chief city, lying inland and far towards the north. The country lay behind *Chrysē* (i. e. Indo-China) and where the

* A paper read at the Geographical Section, British Association, Southampton Meeting, augmented and revised by the author for the "Proceedings B. G. S."—[Ed.]

sea comes to an end, -i.e. where navigation then terminated. This country of *Thin* is difficult of access; it stretches from this eastern extremity of the earth far towards the north and west, so as to approach the Caspian. It sends silk and silk stuffs to the ports of Western India through Bactria, as well as by another route debouching on the Ganges.*

The country thus defined is evidently, as its name would lead us to expect, *China*.

Ptolemy's statements (including those of Marinus) represent the great nation of the east, occupying the extremity of the known and inhabited earth, under a double aspect and title, viz. as *Seres*, when reached by the long land-route through Central Asia, and as *Sinæ* when reached by the sea voyages of which we shall speak more particularly.

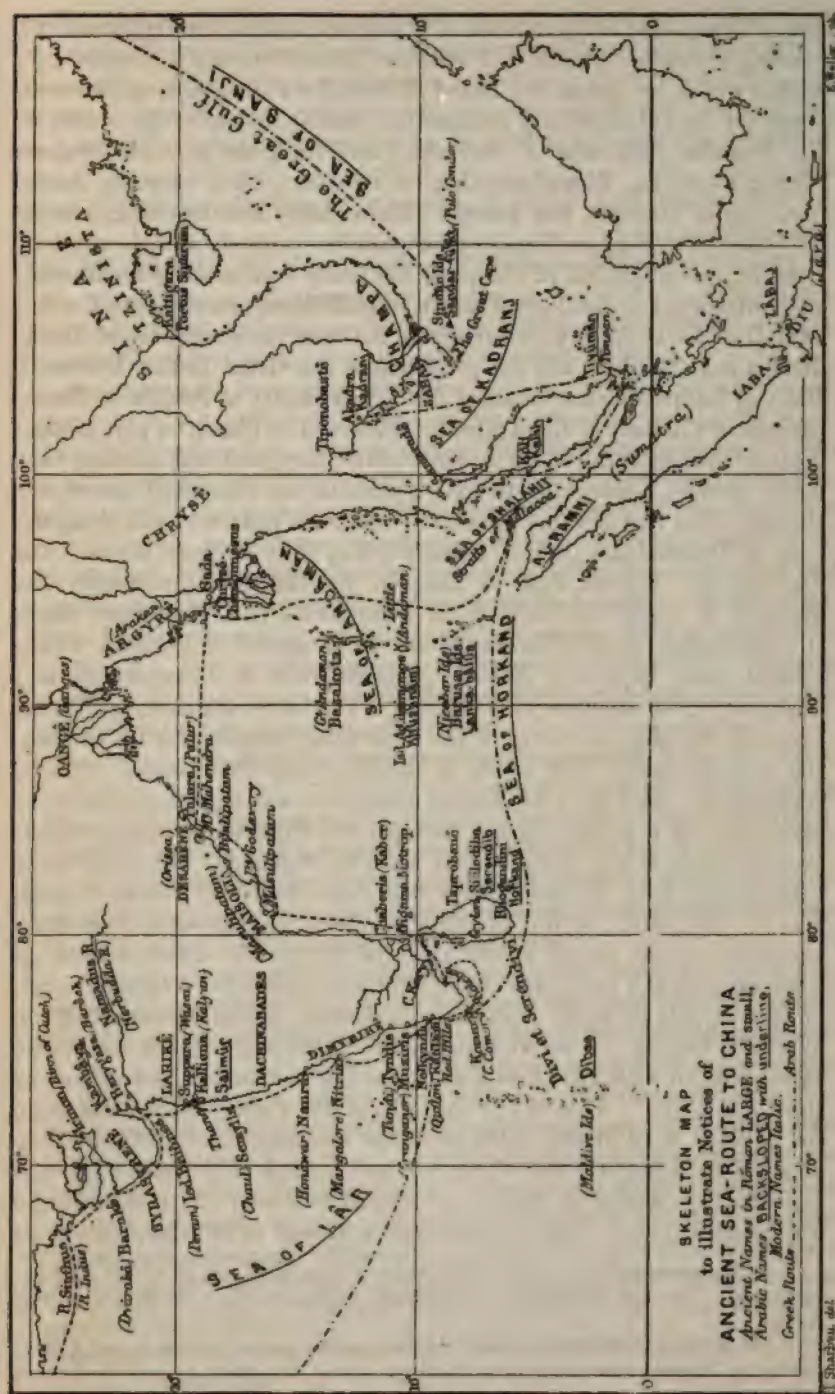
In the notices of Cosmas, we find the conception of China in a more distinct and modern shape, and the name now quite indisputable; but still there has been no break in the tradition. He has a correct idea of the position of *Tzinista* (or *Chinistân*), the remotest of all the Indies, and the country of silk, as lying on the extreme eastern coast of Asia, "compassed by the ocean running round it to the left (i.e. the north), just as the same ocean compasses Barbary (i.e. the Somál country in Eastern Africa) round to the right" (or south). Beyond it was neither habitation nor navigation. To reach it the navigator passed the Pepper Country (i.e. Malabar), *Siëlediba* or *Taprobané* (i.e. Ceylon), the Coast of the Conch or *sankh*-shells (Tinnevely), and *Kaber* (probably the Cauvery Delta). Further off was the Clove Country (i.e. the islands of the Indian Archipelago), and then *Tzinista*.

We next come to the Arab voyagers of the eighth and ninth centuries. The most material difference between them and the navigators of the first century is that the latter, though acquainted with the direct monsoon courses, and sometimes using these, for the voyage from the Red Sea and its vicinity to Guzerat and Malabar, did not apparently yet venture on the direct voyage across the Bay of Bengal.

But the nature of the trade, and of the pick-up cargoes which are indicated in the *Periplus*, probably made the coasting voyage more usual even on this side of Cape Comorin.

Let us follow the Greek or Persian navigator from the Persian Gulf, taking him up where he first comes into Indian waters. He passes the low flat coast into which *Sinthus* (the Sind or Indus) discharges by seven mouths, touching at a port called *Barbaricon*, represented by the *Lâri Bandar* of later days. He then passes the dangerous shallows off the

* It would be beside the present purpose to discuss this curious notice of such a trade route. See the present writer's essay introductory to Captain Gill's 'River of Golden Sand,' and the other testimonies to such a traffic cited there. I will quote these words: 'The trade that brought these stuffs must have been of that obscure hand-to-hand kind, probably through Tibet, analogous in character to the trade which in pre-historic Europe brought amber, tin, or jade from vast distances' (op. cit. p. [32]).



gulf of *Irinon* (the *Iriṇa* or Rinn of Cutch) and *Baraké* (or *Dvārakā*), and coasting *Syrastréné* (Sorath, or Peninsular Guzerat) enters that other gulf within which he passes the island *Baíones* (or Peram, famous in recent times for its extraordinary mammalian fossils), and so to the mouth of the *Namadás* (Narmada or Nerbudda) and its great port of *Barygaza* (Bhrigukachchha, Bharakachchha, or Baróch). Then coasting *Láriké* (continental Guzerat, the ancient Hindu *Láta*) and touching, among other marts, at *Suppara* (Supára near Bassein—properly *Wasai*—north of Bombay, and where Mr. J. Campbell has lately been making excavations with interesting archæological results); at *Kalliena*, mentioned by Cosmas as well as the Periplus writer (Kalyán, the chief town and port of Tanna district near Bombay, and the point where the Great Indian Peninsula Railway bifurcates after crossing the Tanna strait), at *Sémylla* or *Tymála* (*Šaimúr* or *Chaimúr* of the Arabs, i.e. Chetwul or Chaul,* a port famous down to the beginning of the seventeenth century, and still existing,† too much reduced, apparently, to have a place in the 'Imperial Gazetteer,' though it has two or three lines in 'Thornton's'), and so forth along the coast of *Dachinabades* (i.e. of *Dakshināpatha*, the "southern region," the *Deccan*), and beyond that to *Dimyriké* (or the Tamil country), i.e. Malabar, in which the chief ports were *Naura* (i.e. Honáwar), *Nitria* (i.e. Mangalore on the *Netravati* river, the *Mangaruth* of Cosmas), *Tyndis* (Tundi near Beypore), *Muziris* (Muyiri Koḍu or Cranganore), and *Nelkynda*. The absolute identification of the last is not easy, but it was probably *Kallaḍa*, on a river of the same name entering the backwaters, the only navigable river south of the Perriár at Cranganore. This is probably the same place as *Kanetti*, famous in the legendary history of Malabar; and it is still a great entrepôt for Travancore pepper, which is sent hence to the ports on the coast for shipment. That *Nelkynda* cannot have been far from this is clear from the vicinity of the *Ἰνυππὸν ὄρος* or "Red Hill" of the Periplus, which is mentioned in immediate succession to the mouth of the river of Nelkynda. There can be no question that this is the bar of red laterite which, a short distance south of Quilon, cuts short the backwater navigation, and is thence called the Warkallé Barrier. It forms abrupt cliffs on the sea, without beach, and these cliffs are still known to seamen (as the navigation books show) as the "*Red Cliffs*." This is the only thing like a sea-cliff from Cananore (or perhaps from Mount d'Ely) to Cape Comorin. A little further is *Komarei* or *Komaria* (Cape Comorin), and beyond that *Kolchoi* and the pearl-fishery (*Korkai* or *Kolkai*, an ancient site near the mouth of the *Tâmraparni* river). The Periplus writer, as well as Ptolemy, it must be

* In foreign names the *q* (*quād*) of the Arabs constantly, as may be seen in Professor Sprenger's 'Post und Reise-Route des Orients,' represents *ch*, a sound absent from Arabic.

† Mr. Burgess thinks Semylla may be a place called *Chemula*, which is said to have existed on Trombay Island, adjoining Bombay. But of this there seems to be little or nothing known.

noted, regard not Cape Comorin but the next succeeding cape, called by Ptolemy *Kory* (i. e. *Koṭi*, the "bow-tip," the point of the island Rameshwaram), as the southernmost point of India.

Here *Taprobané* or Ceylon is apparently left to seaward, and the navigator after passing through Palk's Strait, and touching at several ports, such as *Nigama metropolis* (of Ptolemy), probably Negapatam, *Kamara* (*Chabéris emporium* of Ptolemy, probably Kaveripatan, formerly a port of importance near the mouth of the Cauvery), *Póduké* and *Sopatma*, which we cannot identify, reaches *Masalia* or *Maisólia* (Ptolemy), the coast between the Kistna and Godavery, still marked by the name Masulipatam, which the striving after meaning has converted and vulgarised into *Machlipatam* or "Fish-Town."

From *Masalia* the navigator of the *Periplus* "crosses the Gulf," i. e. giving a wide berth to the Godavery sands, and leaving to port the bay of Coringa, he strikes across the sea, making the land again in *Desaréné* or Orissa, perhaps taking for his landmark Mount Mahendra, the highest mountain on the coast (lat. $19^{\circ} 4'$, height 4923 feet). From this point, ships bound for the Ganges would renew their coasting; those bound for *Chrysé*, or Indo-China, took a fresh departure and struck across the bay nearly on a parallel of latitude to *Sada* in *Argyré*, or Arakan. Here then is the point which Ptolemy calls *Ἀφετήριον τῶν εἰς τὴν Χρυσὴν ἐμπλέοντων*—not, as Lassen makes it, a harbour from which voyages to *Chrysé* were made, but the point of departure from which vessels bound thither struck off from the coast of India.

A little above this point Ptolemy has a town called *Palura*, which we still find—*Palūr*—in lat. $19^{\circ} 27\frac{1}{2}'$, some five or six miles above Ganjām. This place is mentioned both by Barros (1552) and Linschoten (1597). And the passages in the *Periplus* and in Ptolemy to which we have been referring are aptly illustrated by extracts showing the course of navigation 1500 to 1600 years later. Thus Linschoten has the following sailing directions (which I give slightly condensed):—

"In the August monsoon, after leaving the Ceylon coast, the navigator will keep north to the cape called *Ponta de Guadovarín* [Point Godavery] in 17° . . . He will then continue to run along the coast, taking care not to pass the $19\frac{1}{2}^{\circ}$ [it should be 19°] without sighting land, for here there is the mouth of a river called Puacota. . . . All this coast from Point Guadovarín is high and mountainous, and easily seen from afar. From the river of Puacota to another called *Paluor* or *Palura*, a distance of 12 leagues, you run along the coast with a course from S.W. to E. Above this last river is a high mountain called *Serra de Palura*, the highest mountain on the coast. This river is in $19\frac{1}{2}^{\circ}$," &c. The *Palura* river in $19\frac{1}{2}^{\circ}$ must be the river of Ganjām ($19^{\circ} 23'$), and the river of Puacota must be that of Barwa ($18^{\circ} 54'$) which is just 13 leagues down the coast. The latter, lying under Mount Mahendra, seems to answer precisely to Ptolemy's *Aphetérion*.

Turning again to Valentijn's great book on the Dutch East Indies (1727), under a notice of Bimlipatam, we find the following:—

"In the beginning of February there used to ply, as long as the trade lasted, for the first despatch to Pegu, a little ship with such goods as were in demand, and which were taken on board at Masulipatam. . . . From that place it used to run along the coast up to 18° N. latitude, and then crossed seawards" [in fact it took its *aphetérion*, but somewhat further south than the ancients] "so as to hit the land on the other side about 16°, and then, on an offshore wind, sailed very easily to the Peguan river of Syriang*" [Syriam below Rangoon].

The Periplus carries us to the mouths of the Ganges, where there was a mart so called (*Gangé*), and to the beginning of the continent of *Chrysé*, i. e. Indo-China, but gives no further detail. For this we go to Ptolemy. He gives us the coast of *Argyré* ("Silver-land") and *Chrysé Chersonnésus* with *Chrysé Chôra* behind it, "the Golden Peninsula" and the "Golden Region." In *Argyré* we have undoubtedly Arakan, but I have been able to trace no Indian suggestion of the name, or of the *mines* which are said in Ptolemy to have existed in it. The Golden Chersonnese is specifically the protuberant Delta of the Irawadi, Pegu, the *Suvarna Bhūmi* or Golden Land of ancient India, whilst the Golden Region behind is Burma, the oldest province of which, above Ava, is still formally styled in state documents *Sona-paranta*—"Golden Frontier." Ptolemy's *Chalkitis* also, or "Copper Region," approximates curiously to the *Tampa-dīpa* or "Copper Island" of the Burmese state phraseology, a region which embraces Ava and the ancient capital Pagán.

Proceeding further, the navigator reaches the city of *Kôli*, or *Kôlis*, leaving behind him the islands of *Bazakota*, "Good Fortune" (*Αγαθὸν δαίμονος*), and the group of the *Barusæ*. Here at *Kôli*, which I take to be a port of the Malay Peninsula, the course of the first-century Greek and of the ninth-century Arab come together; and before going further it is desirable to take up the route of the latter.

The Arabs discriminated a variety of "Seas" that were passed on the route to China. First, of course, the starting-point being Obollah at the head of the Persian Gulf or Siráf on its northern shore, is that sea (*Bahr Fârs*). Then the Sea of *Lâr* (*Bahr Lârawî*), i. e. of the Greek *Lariké* of which we have spoken. This sea washed the shores of *Šaimûr*, *Subara*, *Tânâ*, *Sindân*, and *Kambâya*. The last is well known; of *Šaimûr* and *Subara* we have already spoken, as well as of *Thâna* (or Tanna as the Gazetteer spells it), near Bombay; it was visited by Marco Polo in the end of the thirteenth century. *Sindân* is famous as the port where the Parsi immigration first landed in India, and has become, by an odd corruption, in our sea nomenclature, "St. John's."

The Sea of *Lâr* was reckoned to terminate at certain numerous islands known as the *Dibas*, of which *Serendīb* (Ceylon) was the last and greatest;

* Valentijn, vol. v. "Choromandel," pp. 44-45.

a view of things set forth in that passage of Ammianus which speaks of the rumours of Julian's accession (A.D. 361) as reaching even to the *Diei* and the *Serendivi*. Here began the "Sea of Horkand," a name which we cannot hesitate to identify with the *Rhogandani* whom Ptolemy places in the south of Taprobanê, a name which long survived in the form of *Rôhana* or *Rohuna* occurring often in the Mahâwanso, as a province of which Mahâgâmo, the *Maagrammon* of Ptolemy, was the capital, and which the early Mahommedans applied in the form *al-Rahûn* to Adam's Peak.

The Sea of Horkand extended to *al-Râmni*, identified with Sumatra not only by its position but by its products (such as Fansûri camphor, elephants, brazil-wood, and cannibals), and by its great extent. The compass of 800 parasangs ascribed to it corresponds roughly with the estimates of Sumatra which we find in Marco Polo ("2000 miles or more"), and in Barbosa (2100 miles), and with the truth, which is about 2300 miles.

The navigators, crossing the Sea of Horkand with the western monsoon, made land at the islands of *Lanja*-, *Lanka*-, or *Likâ-Bâlûs*, where the naked inhabitants came off in their canoes bringing ambergris and coco-nuts for barter, a description which, with the position, identifies these islands with the *Nicobars*, *Necuveram* of Marco Polo, *Lâka-vâram* of Rashid-uddin, and, I can hardly hesitate to say, with the *Barusæ* Islands of Ptolemy.

Beyond these, and not in the track usually followed, were the two islands of the *Andâmân* Sea, inhabited by dangerous and naked negro cannibals. Still further out of the way in this direction, and difficult of access, was a region of mountains containing mines of silver. The landmark to reach these was a mountain called *al-Khushnâmi* ("the auspicious").

This "Land of silver-mines," is both by position and by this description identified with the *Argyré* of Ptolemy. As no silver is known to exist in that region (Arakan) it seems probable that the Arab indications to that effect were adopted from the Ptolemaic charts. And this leads me to suggest that the Jibal *Khush-nâmi* also was but a translation of the Ἀγαθὸν δαίμονος νῆσος or Isle of Good Fortune in those maps, whilst I have thought also that the name *Andâmân* might have been adopted from a transcript of the same name in Greek as Ἀγ. δαίμων. Ν.*

At *Kôli* or *Kôlis*, I have said, the Greek and Arab routes coincide. For I take this *Kôli* to be the *Kalah* of the Arabs, which was a month's sail from Kaulam (Quilon) in Malabar, was a place dependent on the

* *Bazakota*, and the Island of Good Fortune, may be taken as the Great and the Little Andaman respectively. The Arab *Relation* mentions, in an unconnected notice, an island called *Malhân*, between Serendib and Kalah, i. e. between Ceylon and the Malay Peninsula, which was inhabited by black naked cannibals. This may be another indication of the Andaman group, and the name may have been taken from Ptolemy's *Maniola*, which in his map occupy the position in question.

Mahārāja of Zābaj (i. e. Java, or the Great Islands),* and near which were the mountains producing tin. *Ko-lo* is also mentioned in the Chinese History of the T'ang Dynasty in terms indicating its position somewhere in the region of Malacca.†

Kalah lay on the Sea of *Shalāhit* (which we call the Straits of Malacca), but was not very far from the entrance of the Sea of *Kadranj*, a sea which embraced the Gulf of Siam, therefore I presume that Kalah was pretty far down the Malay Peninsula. It may, however, have been *Kadah* or *Quedda* as we write it. For it was ten days' voyage from Kalah to *Tiyūmah* (written also *Batūmah*, *Koyūmah*, &c.—a variation dependent on loose pointing chiefly) a place where they found supplies of fresh water. And this I take it is *Tiyūman* (in charts corruptly *Timoan*) on the eastern side of the Malay Peninsula. The island "*Timon*" is a point of note in Linschoten's 'Course from Malacca to Macau in China' (1597). "Thereon," he says, "are two places where you find good fresh water."

Now the Sea of *Kadranj* was entered, the *Perimulic* Gulf of Ptolemy. Among the coast names of the Greek record we may draw attention to *Samaradé*, and its coincidence with *Samarat*, the Buddhistic name of the place commonly called *Ligôr* (i. e. *Nagara*, the city) on the eastern shore of the Malay Peninsula, subject to Siam; also to the river *Sobanus* (Skt. *Suvarṇa*, Pali *Sobana*, "the golden") and to its synonymy with *Sobanapūri* one of the old cities of Siam in the Menam basin.

The Arabs as before, instead of coasting, struck across by another ten days' run to the port of *Kadranj*. Here was a high mountain to which slaves used to escape. I should identify *Kadranj* with the *Ἀκάδρα* of the Greeks, and place it about Chantabon. "Here," says Crawford (I quote from Ritter, iv. 1069) "at a short distance inland there stands a very high hill, Bombasoi, which affords from its summit an extensive view over Chantabon and Kamboja." Between the *Sobanus* and *Akadra*, the Greek coasting navigators also mention *Tipónobasté*, which would correspond to *Bangpasoi* of our maps, at the mouth of the large navigable river *Bangpa-kong*.

Ten days further (these *tens* are doubtless a little arbitrary or generalised, like the *ten days'* intervals of Herodotus across the Sahara‡) the Arab navigators reach *Sanf* or *Chanf*, which under the limitations of the Arabic alphabet represents *Champa* or the southern extremity of Cochinchina, which I identify also with the *Záβα* or *Záβαι* of the Greeks.

It is true that *Champa*, as known in later days, lay to the east of the

* The *Ιαβα-δίου Ν.* (*Jávā-dvīpa*) of Ptolemy may be either Java or Sumatra or (like Zābaj) include both. His *Ζαβα-δευβαι νῆσοι* are probably a duplicate entry, a kind of error common in all tentative cartography.

† See Bretschneider on 'Chinese Botanical Works,' Foochow, 1870, p. 29.

‡ Herod. iv. 181-183.

Mekong delta, whilst Zabai of the Greeks lay to the west of that and of the μέγα ἀκρωτήριον—the Great Cape, or C. Cambodia of our maps. Crawford (Desc. Dict. Ind. Arch. p. 80) seems to say that the Malays include under the name *Champa* the whole of what we call Kamboja. This may possibly be a slip. But it is certain, as we shall see presently, that the Arab *Sanf*—which is unquestionably = Champa—also lay west of the Cape, i. e. within the Gulf of Siam. The fact is that the Indo-Chinese kingdoms have gone through unceasing and enormous vicissitudes, and in early days Champa must have been extensive and powerful, for in the travels of Hwen T'sang (about A.D. 629) it is called *Mahā-Champa*. And my late friend Lieutenant Garnier, who gave great attention to these questions, has deduced from such data as exist in Chinese annals and elsewhere, that the ancient kingdom which the Chinese describe under the name of *Fu-nan*, as extending over the whole peninsula east of the Gulf of Siam, was a kingdom of the *Tsiam* or *Champa* race.* The locality of the ancient port of Zabai or Champa is probably to be sought on the west coast of Kamboja, near the Campot, or the Kang-kao, of our maps. On this coast also was the *Komār* and *Kamārah* of Ibn Batuta and other Arab writers, the great source of aloes-wood, the country, then, of the *Khmer* or Kambojan people.

From *Sanf* the Arabs sail ten days again to an island (but evidently from the plural form of the name a *group* of islands), called *Sandar-Fulāt*, where they find fresh water. We cannot hesitate to identify this with *Pulo Condor*. Marco Polo, in the name which he gives to the group, "*Sondur and Condur*," has furnished a link, if it be needed, to complete the identification. These may also be the "Satyrs' islands" of Ptolemy, or they may be his *Sindai*; for he has a *Sinda* city on the coast close to this position, though his *Sindai* islands are dropt far away. But it would not be difficult to show that Ptolemy's islands have been located almost at random, or as from a pepper-caster.

We have said that the Arab *Sanf*, as well as the Greek *Zabai*, lay west of Cape Cambodia. This is proved by the statement that the Arabs on their voyage to China made a ten days' run from *Sanf* to *Pulo Condor*.

Now they enter another sea, which they call the Sea of *Sanji*; crossing which they enter the narrow passages and estuaries called the "Gates of China."

In Ptolemy, the distance from Zabai to the *Sinæ* is not determined. According to Alexander, as quoted by Ptolemy after Marinus, "the land beyond the Golden Chersonnese lies facing the south, and sailing by this for twenty days you reach the city of Zabai, and still sailing on for some days southward, but rather to the left, you reach *Kattigara*" (the port of the *Sinæ*). The expression, "southward but rather to the left," is easily

* See "Carte des Lieux Historiques de l'Indo-chine," &c., p. 128 in vol. i. of 'Voyage d'Exploration.'

accounted for, if we recollect what has just been said of the position of Zabai on the west coast of Kamboja. Alexander *must* precisely have run "south but rather to the left" for some days before turning north into the China Sea.

But no doubt Ptolemy, from his preconceptions of the general geography, necessarily misconstrued the further track of Alexander, and may have failed to quote some further indication. Regarding the Indian Ocean as a closed basin, he is compelled to place the *Sinæ* on the imaginary eastern shore of that basin. But we know, of course, that the sea is *not* a closed basin, and that the *Sinæ* *could not* have lain south of Zabai and of the Great Cape, unless we are prepared with a learned German to put them on the west coast of Borneo!

I should say here that I consider it as unreasonable to explain *Sinæ* by any name but Chinese, as it would be to explain *Indoi* by anything but Hindoos or Indians. *Sinæ* does not require to be demonstrated to be Chinese; it *is* Chinese just as much as *Français* is French or *Espagnols* Spaniards. But where lay *Karriyapa ὄρεος Σαῶν*, "*Kattigara* the port of the Chinese," is another question.

When I drew the map of Ancient India with its elucidations, for Dr. W. Smith's 'Classical Atlas,' though saying that I saw no means of determining the position of *Kattigara*, I was still inclined to believe that it was on the coast of China Proper, either of Fokien or of the Yangtse delta. But there was always some misgiving that the Ptolemaic statement was briefer and vaguer than would have been probable had the voyagers actually reached the swarming hive of the Central Flowery Kingdom. And to myself, the arguments adduced by my friend Baron F. von Richthofen in favour of the location of *Kattigara* in the Gulf of Tongking, are absolutely convincing. This position seems to satisfy every condition. For:—

1. Tongking was for some centuries at that period (B.C. 111 to A.D. 263). and at that period only, actually *incorporated* as part of the Chinese Empire.

2. The only port mentioned in the Chinese annals as at that period open to foreign traffic was Kiau-chi, substantially identical with the modern capital of Tongking, Kesho, or Hanoi. Whilst there are no notices of foreign arrivals by any other approach, there are repeated notices of such arrivals by this province, including that famous embassy from 'Antun, King of Ta-t'sin, i. e. M. Aurelius Antoninus (A.D. 161-180), in A.D. 166.

3. The province in question was then known as Ji-nan (or Zhi-nan, French *J*); whence possibly the name *Sinæ*, which has travelled so far and spread over such libraries of literature. The Chinese annalist, who mentions the Roman embassy, adds: "The people of that kingdom (*Ta-t'sin*, or the Roman Empire) come in numbers for trading purposes to *Fu-nan*, Ji-nan, and Kiau-chi." *Fu-nan*, we have seen, was *Champa* or

Zabai. In Ji-nan, with its chief port Kiau-chi, we may recognise with assurance "*Kattigara, portus Sinarum*." *

Mr. Bunbury, in his most able and valuable 'History of Ancient Geography,' whilst admitting the force of my statement as to the identity of the ancient names *Sinæ* and *Thin* with *China*, observes, "It does not appear to me necessary, therefore, to assume that the land so called was actually a part of the modern China. How easily the name might be extended to other regions in that part of Asia is sufficiently shown by the modern application of Cochin China applied to the very country" in which he is inclined to locate the *Sinæ*.

But neither he, nor I in my former consideration of this subject, had taken account of the facts adduced by Richthofen as to the incorporation at that time of Tongking with the Chinese Empire, and as to the recognition at that time of Kiau-chi alone (as far as is known) as a gate of access for western trade to the empire. Richthofen's solution has the advantages of preserving the true meaning of *Sinæ* as "the Chinese," and of locating the *portus Sinarum* in what was then politically a part of China, whilst the remote metropolis *Thinæ* remains unequivocally the capital of the empire, whether Si-ngan-fu in Shensi, or Loyang in Honan, be meant.

I will only add that though we find *Katighora* in Edrisi's Geography, I apprehend this to be a mere adoption from the Geography of Ptolemy, founded on no recent authority. It must have kept its place also on the later mediæval maps; for Pigafetta, in that part of the circumnavigation where the crew of the *Victoria* began to look out for the Asiatic coast, says that Magellan "changed the course . . . until in 13° of N. latitude, in order to approach the land of *Cape Gaticara*, which cape (under correction of those who have made cosmography), (for they have never seen it), is not placed where they think, but is towards the north, in 12° or thereabouts."† It is probable that, as Richthofen points out, *Kattigara*, or at any rate Kiau-chi, was the *Lûkin* or *Al-Wâkin* of the early Arab geographers. But the *terminus* of the Arab voyagers of the ninth century was no longer in

* The name (*Kattigara*) seems (in form) Indian, like so many others on the route to the *Sinæ*, e. g. *Sobana*, *Pagrasa*, *Samaradé*, *R. Sobanus*, *Tiponobasté*, *Zaba*, *Tagora*, *Balanga*, *Sinda*, *Ayanagara*, *Brama*, *R. Ambastus*, *Rabana*, *R. Kottiaris*, *Kokkoronagara*, &c. "At first sight the identification of some of these names with names still adhering, or traditionally preserved, seems hazardous. But note that most of the names just recited are unquestionably Hindu. Hence it is a fact that Hindu names attached to places in Indo-China before the time of Ptolemy. It is another fact that many Hindu names attach now—e. g. *Singapore*, *Patani*, *Ligor*, *Futhia*, *Champa*, *Suphana*, *Chantdon* (probably). Why should not the same name in some cases have survived?"—"Sources and Authorities" for India in Dr. Smith's Atlas.

† 'The First Voyage round the World' (Hak. Soc.) transl. Lord Stanley of Alderley, p. 68. The translator, in what I must call his too usual happy-go-lucky way, explains: "Cattigara, Cape Comorin, in 8° 27' N. lat." The cape looked for was evidently the extreme south-east point of Asia, actually represented by Cape Varela, or Cape St. James, on the coast of Cochin China.

Tongking; it was *Khánfú*—apparently the *Kanpu* of the Chinese, the haven of the great city which we know as Hangohow, and which then lay on or near a delta-arm of the great Yangtse.*

[The chief works of which I have made use in the foregoing (besides the original authorities named at the beginning, the Arabic ones in published translations, chiefly French) are Richthofen's 'China,' Bd. i., 1877; the same author's papers, "Ueber dem See-verkehr nach und von China in Alterthum und Mittelalter," in the 'Transactions of the Berlin Geographical Society' for 1876; 'Sprenger, Post- und Reiserouten des Orients,' Leipzig, 1864; A. Maury, "Des Anciens Rapports de l'Asie Occidentale avec l'Inde Transgangétique et la Chine," in *Bullet. de la Soc. de Geog. de Paris*, 1846; Mr. Bunbury's work just quoted; various notes of my own in 'Cathay and the Way Thither,' 'Marco Polo,' and the text to my map of Ancient India in Dr. W. Smith's 'Atlas of Ancient Geography.']

A Sledge Journey in the Delta of the Yukon, Northern Alaska.

By E. W. NELSON.

Map, p. 712.

DURING the four years dating from the middle of June 1877, the writer was stationed at St. Michael's Rédoute on Norton Sound, Alaska, designated on many of the older maps and charts as Michaelovski. From this point several extended sledge expeditions were made in different directions over little or quite unknown portions of the surrounding region. The first of these expeditions was made during December 1878 and January 1879, and covered the territory lying between the mouths of the Yukon and Kuskokvim rivers and extending a considerable distance into the interior, as seen by the track marked on the accompanying map. With the exception of occasional visits made to a few points of this region by two or three fur traders, the country included in the limits given was totally unknown, and a glance at any map up to the present date will show a blank in this area, except where map-makers have filled in a few details which do not exist outside of their imagination. There is one exception, however, where one of the important and interesting features was indicated long ago,

* See Marco Polo, 2nd ed. ii. pp. 181-182.

† Mr. Ivan Petroff (special agent Tenth U.S. Census), through whom the present paper has been communicated to us, says, "Mr. Nelson, of the U.S. Signal Service and the Smithsonian Institution, first submitted the notes of his discoveries to me, to be used in the compilation of a map to accompany my report on the Alaska census of 1880. But as the publication of the report meets with much delay I persuaded him to offer the results of his important discoveries to your Society. Mr. Nelson is now at the Colorado Springs, trying to recuperate from the effects of his hardships and sufferings in Alaska."

probably from information supplied by natives. This is in the old chart of Tebenkof, where the course of the Kashunuk river is laid down nearly as it is in the map I now submit to the Royal Geographical Society, but which has been omitted in most subsequent charts or maps.

Strict accuracy is not claimed for the locations and distances given on the present map, and the work done is merely a rough reconnaissance, worthy of record merely from the fact of its being the first authentic information obtained concerning that region, and for several reasons more definite information is not likely to be had for many years.

My trip was made in great haste, with the most inadequate means, and with no instrument but a compass. By continued observations as to bearings and distances travelled, data were secured which, combined with the numerous native sketches obtained from the Eskimo at various points, serve to make an approximately correct map of the region traversed, and to correct some grave errors existing in older ones. The lack of instruments for accurately determining positions was greatly regretted, but the unfavourable weather experienced during a large part of the time was such that with a very few exceptions instruments would have been useless. Unfavourable weather will always be found one of the greatest obstacles to an accurate survey of the coast region of Alaska bordering Bering Sea.

The arrangements for the expedition were very simple; a stock of goods consisting of leaf tobacco, ammunition, beads, brass jewellery, needles, and other small wares were selected to be used in buying ethnological specimens and to pay the incidental expenses of the trip among the natives.

On December 2nd, 1878, Charles Petersen, a fur trader living on the lower Yukon, at Andreievsky, arrived at St. Michael's with four dogsledges, three of which were to be laden with goods for the fur trade, one being placed at my disposal. On the 4th, at about 6 A.M., long before daybreak, we filed out of the enclosure and were off through the snow fog which filled the air, and marked a temperature in the vicinity of zero and still falling rapidly. With difficulty each sledge followed the one in front, and the leading team had an Eskimo ahead as a guide over the trackless snow.

Our course was suddenly brought to a stop at the end of half an hour by finding ourselves in a small bay enclosed by an abrupt and rocky shore. The guide had made a curve to the right and not until a pale yellow shade began to dim the stars on the south-eastern horizon, announcing the coming day, did we find our proper course.

From then until just before sunrise, about 10.15 A.M., we kept on in a southerly course until we reached a deserted native hut. Here we stopped to rest our dogs, and afterwards resuming our journey, arrived at the small village of Pikniktalik at 1 P.M., after making about thirty miles. Our road during the day led over the flat coast country intersected

by numerous tide creeks and dotted with brackish ponds. This country is so low that extraordinary high tides overflow a large portion of it, strewing drift logs on the borders of the slight elevations in summer, and covering large areas with ice in winter. Although bordering the shore near St. Michael's, the mountains fall back to a distance of from five to 10 miles from the sea to the south, with this low country reaching to their bases.

These mountains are all of volcanic origin and the truncated tops of numerous craters are to be seen along their line of extension. On St. Michael's Island and northward the beds of dark basaltic lava jut upon the sea, and form a large part of the rugged shore line in that vicinity. The coast-country here is totally bare of trees; a few scraggy alders in patches along sheltered slopes of the mountains and hills, with dwarf willows somewhat more widely spread, constitute the whole of the woody vegetation near the sea with the exception of a few small cottonwoods near Pikenitalik.

December 5th, at 1 A. M., we arose, and after a hasty breakfast of bread, tea, and dried fish, left our camp and proceeded directly to the coast, along which we travelled, passing the headland of Cape Romanof, and reaching a point midway between it and the mouth of the Pastoliak, when the darkness was rendered more intense by the rising wind filling the air with flying snow. This forced us to hug the shore closely, and make our way by following the line of drift-wood which marks the beach in the vicinity of the Yukon mouth.

At 8 A. M. we arrived at Pastolik, over 30 miles from our camp, and after an hour's rest resumed our course and at 11 A. M. arrived at Kotlik, about 12 miles from Pastolik. Kotlik is the fur-trading station for the district including Pastolik and the Yukon delta. Kamkof, a Russian creole, has charge of this station and lives here with his family. After the inevitable "tea drink" we resumed our road, and passed rapidly up the river on a well-beaten track. Ten miles above Kotlik we passed two log houses where a Russian and a creole are settled with their families to live upon the fish which the Yukon affords, with such additional means of subsistence as may be gained by trapping and trading with the natives. As darkness was drawing near we reached the village of Fetkina. From our starting-point in the morning we had made about 60 miles without the dogs showing signs of much fatigue, although we had all ridden most of the time. The roads were exceptionally good, however, which accounted for this speed.

The low coast-country ends about the base of the hills forming Cape Romanof, from which to the vicinity of Pastolik the country is more elevated, being covered with knolls and broken ground, but not rising into hills. These knolls afford footing for a considerable growth of alders and willows which become larger the nearer the Yukon they are found.

From the vicinity of Pastoliak and Pastolik, and including the entire Yukon delta, a strong, and in most places, dense growth of bushes reaches the coast. As we left Kotlik (an Eskimo name meaning "breeches," and thus used to designate the union of two small streams at that place), and proceeded up stream, the bushes became rapidly larger until 15 miles or so from the sea, clumps of cottonwoods, growing 30 feet or more high, began to be met with, and at Fetkina the banks of the Yukon appeared densely covered with what appears like a strong second growth, though here it is the original woods.

As the river is very low in the autumn when the surface freezes, we had excellent opportunities to examine sections of the bank, sometimes 20 feet high. In every case the soil was found to consist of an alluvial deposit, frequently enclosing trunks of trees, buried from one to 10 or 15 feet below the surface.

In the evening I announced through my interpreter my desire to buy samples of all the tools and implements used by the villagers, as well as toys and ornamental carvings. This unusual request produced quite a flutter of excitement and a number of interesting articles were secured. Some of these must have required a considerable expenditure of skill and labour, yet they were parted with at what appeared to be a ridiculously low price.

December 6th.—We started at 5 A.M. and travelled all day up various winding branches of the Yukon mouth, arriving at Ingichuk after a 12 hours' tramp.

Our course was walled in all day by an unbroken line of bushes bordering the channels and covering the numerous islands. By the broken character of the ice along the banks and the presence of water upon it at various points along the shore, we were enabled to trace tidal action up to about 25 or 30 miles from the sea; near Ingichuk, however, the swiftness of the current is sufficient to overcome the backwater and to cause openings in the ice.

Our stopping-place, like other small villages on the lower Yukon, was formed of a group of underground huts, lined with drift-wood and covered with earth. These villages are always located where a good fishing-place in the river offers special inducements.

December 7th.—At 2 A.M. we left our camping-place and crossed numerous sandbars, which fill the channel of the Yukon from Ingichuk up the river; these are in many cases islands in process of formation which mark the destruction of those higher up the stream. Ten or twelve miles from our starting-place we passed Kashutok, opposite which, on the left bank going up, the lowest mountains bordering the Yukon are found. We travelled under the shadow of these until, just as the twilight of the morning rendered objects visible, we rounded a spur, and passing some natives at work on their fish-traps, drove swiftly up to the station of Andreievsky, amid a great din of yelping dogs and shouting

men. We remained at this station for the next three days, preparing for our start into the little known country to the south, where the main results of the trip were to be obtained.

Andreievsky consists of a group of a half-dozen log buildings forming a square, and joined together by a stockade; it is an important centre of the fur trade on the lower Yukon, mink, land-otter, white and red foxes, with a few black bear, wolves, beaver and marten, comprise the peltries secured here—the mink largely outnumbering all the other kinds. This station has a bloody history, like many other places in the fur countries. Its inmates were massacred by the Eskimo during the Russian occupation of the country, but the swift and just extermination by the Russians of the parties engaged in this affair has made a lasting impression among the Eskimo of the lower Yukon, and goes far to account for the comparative safety with which one may travel there at present.

The road from St. Michael's was almost unmarked by evidences of animal life until we reach the Yukon delta, when the tracks of various fur-bearing animals were plentiful. A few white ptarmigan, mealy redpolls (*Aegialius exilis*), and an occasional gyrfalcon (*F. sacer*), comprised all the birds, and these were also found along the Yukon. The banks of the river up to Andreievsky are bordered by a dense growth of willows and alders, with numerous clumps of cottonwoods scattered among them, easily distinguished by their greater height.

On the 11th we left Andreievsky and descended the river to Kashutok. On our way to this place we found that the cold was sufficient to render the snow crisp and hard, and make the iron runners of our sledges drag almost as if on sand. To obviate this we halted and had a pair of false runners made of the hard sap or outer part of a stick of young fir. This is called *krains* by the Russian traders, and when cut out is equal in length to the runner and about two inches or less thick by two broad. Each one is pierced laterally by a series of four or five holes by means of which it is lashed firmly to the under surface of the iron or steel runner, and when thus shod with a smooth hard piece of wood the sledge glides easily along in the coldest weather if on inland snow or ice. On the sea-coast these runners are rarely used, owing to the friction caused by the salt which is found mixed with the surface snow.

Leaving the Yukon at Kashutok, we crossed a series of low hills, which render the ground very broken between this place and the Kusilvak mountains. Just as we reached these hills we crossed a small stream which connects with the Yukon opposite Andreievsky and flows with a sluggish current toward the sea-coast, where it empties just south of the Kusilvak mouth of the Yukon. This stream is the Kipniaguk of the natives, and at its mouth is the village of Kipniaguk (spelt Kipniuk on most maps). In the evening we reached a branch of the Black river; near its source in a shallow lake on the north side of the Kusilvak mountains, and following the stream to the east, we arrived at

the village of Chefokhlagamiüt,* where we passed the night. The people of this place, containing four huts, were nearly all away at a festival in a distant village. Like all the people of the surrounding villages these were Mogemiüts or Mink people—so called from the abundance of this animal about the lakes and creeks in their country.

On the 12th we skirted the Kusilvak mountains to their southern face, crossed the Black river, and passed on a westerly course toward the Askinuk mountains which lie about Cape Rumiantzof.† Although the hurried character of my journey allowed no time to make a special visit to the Kusilvak mountains, we could plainly perceive their volcanic origin, as we passed within a short distance from them. These mountains rise to about 2000 feet, and are so compactly grouped that they appear like an island rising from the flat, open surrounding country. The natives claim to have obtained native copper from one of the high peaks here, of which they made knives in ancient times, before the white men brought them iron.

We found the country between the Kusilvak and Askinuk mountains low, but very hummocky and difficult to traverse. Numerous small ponds were crossed, and near the Kusilvak, willows and alders were plentiful. In the evening we crossed four lakes lying at the base of the Askinuk mountains, and arrived at a miserable Eskimo village of two huts called Igragamiüt, in the midst of a terrific storm of wind and snow which was so fierce just before we reached the village that my sledge was torn from me, hurled over several times and broken in many places. We found our quarters in an earth-covered hut, less than four feet high in the centre, and sloping on every side. The floor was covered with a deep layer of garbage, giving rise to a horrible stench, while about the low platforms on the sides crouched a number of pasty-faced children and sickly looking elders; a litter of puppies were snuffing about among the wooden dishes in the farther end of the place. A large cake of ice served as window in the roof, and everything bespoke the most abject filth and poverty.

December 14th.—We arose early to escape the stifling odours of our sleeping-place, and followed a stream along the southern base of the Askinuk mountains until we were within sight of the sea. This stream is small until near the coast, when it suddenly broadens. The mountains here form the bold, rocky headland of Cape Rumiantzof, and are rather rugged in their slopes in some places. Along the southern side they are more rounded, with immense angular rocks set here and there along their sides of various strange and fantastic shapes. These mountains appear to be of volcanic origin, but I had no opportunity for a satisfactory examination. Their sides as well as the surrounding country are

* The terminal word in these compound names of places is spelt on Mr. Nelson's map *mute*, instead of *miüt*.

† Cape Romantzof of the map.

bare of trees, and only a few dwarfed willows and alders are found in sheltered spots. The highest points of these mountains scarcely attain 1500 feet in elevation, and their rounded outlines rise abruptly from the low, nearly level country.

Leaving these mountains we crossed a range of low hills to the south and arrived at Askinuk, where we were welcomed by the entire population, numbering nearly 200 Eskimo. The people here were among the most hospitable I met on my expedition. As we approached, their smiling countenances and round brown-skinned faces made a pleasant sight, and we were scarcely in the village before our dogs were unharnessed and the sleds placed upon the framework, and we were invited into the large roomy *kazhga*, or council house.

While I wrote up my journal, the natives were practising songs to be sung at some festivals to be given later in the winter. Before I retired a very large number of fine ivory carvings and other objects of great ethnological interest were secured, in exchange for small articles. Many of the carvings obtained here are remarkable for their elegant finish and the excellent but somewhat grotesque character of the workmanship.

December 15th.—Leaving Askinuk, we crossed a long shallow bay containing a low sandy island in the middle and then took a south-easterly course across a very low flat country to the village of Kushunuk on a small branch of the river having the same name.

The bay at Askinuk has been named in honour of Captain C. L. Hooper, who commanded the steamer *Corwin* during her Arctic cruise in the summer of 1881, and during which time I was his guest and the recipient of many favours at his hands. This bay is undoubtedly too shallow for vessels, as from the configuration of the ice on its surface I should judge it to be only a few feet deep over most of its extent. Kushunuk is a large village of between 100 and 200 people, and consists of a cluster of the usual underground huts built on a mound some 8 or 10 feet above the level of the surrounding country. This mound has been formed by the constant accumulation formed during the great length of time this spot has been occupied, and its artificial character becomes evident upon examination.

On entering the *kazhga* we found a hunting festival in full progress, and as, during this feast, no visitor or any one else must leave the village on a journey or to do any ordinary work, we found ourselves compelled to rest here several days. We left on the 18th for Kaialigumiüt.

Rising in a small slough of the Yukon, close to the village of Starik-vikhpak, above Andreievsky, the Kushunuk river flows sluggishly in a very sinuous course south-westerly to the sea, and is constantly augmented by small tributaries until near Kushunuk village it is about a mile broad from bank to bank. As may be noted on the map, the village of Kushunuk lies on a small tributary, and above the village about 15 or 20 miles the stream divides, one branch flowing nearly due west

into Hooper Bay. From the natives we learned that about 80 miles up the Kushunuk, above the village, the stream spreads into a shallow lake some 20 miles long, and varying from 1 to 8 miles in width. Some 16 miles south-easterly from Kushunuk we reached the Manopiknak river, a stream nearly as broad as the Kushunuk at our crossing. This stream rises in a large lake about 50 miles south of Andreievsky, and has a course almost parallel to that of the Kushunuk. About 15 miles beyond the Manokinak we crossed the Azoon. This stream is mainly a tide channel, which at high water is from three to four miles across for some 40 miles above its mouth. At low tide the water flows through a half-mile channel.

A snowstorm and fog forced us to sleep on the ice in the middle of a brackish lake, and the next morning we reached Kaialigumiüt after crossing a tide channel as broad as the Azoon, and which unites with the latter 40 or 50 miles from the sea. The channel just crossed flows south-west into a shallow estuary or bay, which has been named in honour of General W. B. Hazen, Chief Signal Officer, U.S.A., under whose directions so much is being done at present to advance Arctic explorations.

About Kaialigumiüt are ridges of low knolls 10 to 30 feet high—the only breaks seen in the uniform level of the country since we left Askinuk. A strange facial peculiarity was noted as quite common among the people of Kaialigumiüt. The superciliary ridge is very much developed from over the middle of the orbit extending inwardly to the base of the nose. The sides of the head consequently appear as if bevelled off from the ears forward to the commencement of this ridge, and the sloping forehead ends by a strong bony ridge. There were about 100 people living at this place.

Leaving this village, we shaped our course towards a volcanic peak visible to the south-east. This peak rises about 2000 feet above the surrounding plains, and is considerably above the rest of the small group of mountains which occupy the area indicated on the map. Flowing from the Hazen bay, along the north-eastern face of the mountains, is a channel about four miles broad, through which the tide flows with considerable velocity to a large lake-like inlet which lies on the inland side of the mountains. A tide channel connects the inlet with the sea on the south of the mountains, thus enclosing this area and forming an island, which Mr. Henry Gannett, Geographer of the U.S. Census Bureau, to whom these discoveries were first submitted, has named after the writer of the present narrative.

On December 21st we left Ookagamiüt, and made a hazardous passage for several miles along a narrow ice-foot which bordered the seaward face of the mountains. Finally we were forced to abandon this track, as the shelf narrowed so, that it would have been impossible to avoid falling into the open sea, which surged back and forth below. We were caught in a terrific wind and snowstorm on the mountains,

and by great good fortune reached the village of Tanunak at Cape Vancouver, with only a few slight frost-bites. Although the village is very small, a half-breed fur trader is stationed here with a small stock of goods. The storm delayed us here until December 24th.

Passing to the south-east we found the mountains, which render the coast-line so rugged about Cape Vancouver, limited to the northern half of Nelson Island, the southern half being very low and flat.

On December 25th a heavy rain commenced, which drenched us through in spite of our seal-gut waterproofs, and on the 26th it continued with great violence, accompanied by wind. All day we plodded drearily on through the rapidly melting snow and the pools of water, reaching a shelter in Sfogangamiüt just as darkness came on. Here we stopped over a day in the *kazhga*, and dried a portion of our clothing by getting some of the natives to wear it for us, and thus evaporate some of the moisture from it by the heat of their bodies.

On the 28th, the fur trader who accompanied me thus far said he would not proceed farther, as the weather was too bad to travel. He turned back towards the Yukon, while I with my interpreter advanced on our road, and after working over bare ground, and wading numerous ponds and streams, arrived at sunset, utterly exhausted, at the village of Chichinagamiüt. This place is situated on a slight rise about 10 miles from our starting-point in the morning. We were weather-bound here until the 31st of December, when the temperature fell and the rain ceased, enabling us to proceed. Leaving the groups of low volcanic cones which lie back of our stopping-place, we followed the course of a small creek to the sea, and thence across a shallow estuary formed by the mouths of the Kinak and Kuguklik rivers. Following up the latter a few miles we reached the village of Chalitmiüt, containing about sixty people. From native maps and the fur traders I learned that both the streams just named rise in lakes; the head of the Kinak is close to Baird Inlet, and it has been named in honour of Mr. W. H. Dall, of the U.S. Coast Survey, whose work in Alaska is so well known.

From Chalitmiüt to Koolvagavigamiüt the coast country is very low, and we found large areas covered with a heavy layer of sea-ice forced up by the late storms. Blocks of ice from three to four feet thick, which were found several miles inland in many places, showed how extensively the sea had overflowed this area.

The village of Chalitmiüt narrowly escaped being razed by the ice which was carried about it by the water, and on the night of December 29th, the people sat upon the roofs of the houses, driven from the interior by the three or four feet of water which poured in and compelled the occupants to cut their way through the roof in some cases. The loss of entire villages with their people is not rare on the lower Kuskokvim country during storms of this character, and during spring freshets.

The village of Kongiganagamiüt contains about 175 people, and is one of the places which has seen but one or two white men since the occupancy of the country by the Russians. The children, as in many other places visited, were terrified at my approach, and rushed shrieking to their mothers as if an ogre were about to seize them. From Kashunuk to this last named village walrus are taken more or less commonly along the coast, and the natives are very expert at ivory working, many of their carvings showing evidence of great artistic skill, considering the rude tools used by the workmen.

January 5th.—We travelled from Koolvagavigamiüt to Kinagamiüt. Bordering the estuary of the Kuskokvim about the former village is a series of knolls and very low hills, beyond this and up the river a few miles bushes begin to appear on the bank of the stream, which, from Kuskokvakh upwards, become more continuous, as well as gradually larger until trees take their place, some distance above Kinagamiüt. The trees and bushes on this stream are the same as those on the lower Yukon.

From Kinagamiüt, which contained over 175 people, we turned our course towards the Yukon, crossing what is known to the fur traders as the Big Lake Country, from the number and size of the lakes found there. The lakes are connected by a network of sluggish streams which unite in one main channel and flow into the Kuskokvim above Kinagamiüt. These lakes and streams abound with white-fish (*Coregonus*), and the lately described *Dallia pectoralis* Bean. In consequence of the large food-supply here this is perhaps the most thickly peopled district of Alaska north of the Kuskokvim river. For some distance before reaching the Yukon we kept along the course of a narrow sluggish stream called by the natives the Kivvichavak.

A series of low hills thinly clad with spruces were crossed, and before us lay the Yukon with its white snow-covered path winding away to the horizon, and facing us the rugged but not high mountains which line the river from Ingahameh to above Ikogmiüt. From this point we ascended the Yukon to Paimiüt, the upper limit of the Eskimo on this river, and then returned to the sea-coast and St. Michael's by way of the well-known and much travelled river route.

During this expedition, over 1200 miles were traversed, the same dog-team being used throughout, and as an example of the endurance of the animals I may cite the fact that on the last day we travelled from Pastolik to St. Michael's, a distance of 60 miles, with a bad road a large part of the way. In all the coasting from the mouth of the Yukon to that of the Kuskokvim, excepting merely the small part covered by mountains, as shown on the map, the country is so low that the tide flows up the river from 10 to 50 miles, and we were frequently unable to find a fresh-water stream or lake from which to obtain drinking water, even when 20 to 30 miles from the coast. Bushes are scarce, being found

sparingly on some of the streams. Wood is an article of great scarcity and is frequently brought many miles by boat (in *oomiaks*) in summer.

There is water-travel from the Big Lake Country to the sea, and the wood for houses in that section is obtained from a great distance. In many places the houses are made of bushes interwoven, and covered with dirt, forming a bee-hive-like mound covered with earth, and with a slab of ice over the hole in the roof to light the interior. These houses are rarely more than four or four and a half feet high, and are almost invariably crowded to excess and abound in all manner of filth, which is frozen solid during the coldest weather, but forms a soft mass of putrescent substances at other times.

Skin diseases are quite common, and a large number of the children are sickly, showing a peculiar pasty complexion. The people occupy central villages in winter, frequently some distance from tide water, but in summer and fall they scatter in parties all along the sea-coast and the larger streams, where they engage in fishing salmon, white-fish, and tomocods, or in hunting seal, walrus, and white-whale. Their stature averages about five feet three or four inches, and is less than that of the Malemiut living farther north, about the shores of Kotzebue Sound.

Along the entire coast from the Yukon mouth to that of the Kuskokvim the water is shallow and unfit for navigation except perhaps for small schooners at certain points. The water is deepest off Cape Rumiantzof and Cape Vancouver. The tide runs with considerable velocity between Nunivak Island and the mainland.

The general characteristic of the country over most of the region between the lower Yukon and Kuskokvim is that of a barren waste, whose streams and lakes with the bordering sea-shore support a population of over 3000 pure blooded Eskimo. These are among the most primitive people found in Alaska, and retain their ancient customs, and their character is but slightly modified by contact with whites. They present one of the richest fields open to the ethnologist anywhere in the north. They retain their complicated system of religious festivals and other ceremonies from ancient times. Their work in ivory and bone bears evidence of great skill, and all their weapons and utensils are well made.

Time and space forbid my entering more in detail here upon many points of interest in regard to this region. In reports upon which I am now engaged, however, these subjects will be duly elaborated.

*Notes of a Journey through part of the Andean Table-land of Bolivia
in 1882. By JOHN B. MINCHIN.*

Map, p. 712.

HAVING lately had occasion to pass through and survey a part of the Andean table-land which has not, I believe, been hitherto visited or described by any travellers, I think, perhaps, a few remarks on the subject, together with copies of my maps, though these are not so detailed as I could have desired, may be acceptable to the Society.

I was commissioned by the Government to survey the country lying between Oruro, the head-quarters of the army, and the western or coast range of the Andes, and commenced operations with a triangulation on the "pampas" or plains north of Lake Poopó, thence determining the positions of all the mountain peaks visible. This operation I had occasion to repeat several times during the progress of the expedition, and the connection between the various triangulations being everywhere effected, afforded a result, so far as it goes, quite as accurate as was desired, the details being afterwards filled in by magnetic and azimuth bearings, though as regards this, the want of practised assistants and the scarcity of the other resources at my disposal prevented my making much more than a skeleton map of the country, the want moreover of forage for my mules, and the consequent impossibility of maintaining them for any length of time in such a barren region, obliged me to hasten through the work and complete the whole in one month.

The vast Andean table-land, situated at an average elevation of from 12,000 to 13,000 feet above the sea-level, is not as might be supposed an uninterrupted plain, but is broken up by isolated groups of hills and intersected by secondary ridges; these however are usually insignificant by the side of the ranges which bound this zone. On the eastern side rises the Cordillera Real or principal chain of the Andes, composed of stratified masses which in the northern part, penetrating far into the regions of perpetual snow, are crowned by the culminating peaks of Sorata and Illimani. The coast range on the contrary, which bounds the table-land on the west, is of igneous formation, presenting a mighty succession of volcanic peaks, many also snow-clad, overlooking the Pacific; the greater part of these are now silent and extinct, while others are fully active.

The climate in the neighbourhood of these two ranges, and consequently the appearance of the country, presents a striking contrast. The Cordillera Real, owing to the boundless forests which extend from its eastern slope, is copiously supplied with showers which descend in fertilising streams on the neighbouring plains, which, though a luxuriant vegetation is not possible owing to the elevation, present nevertheless during several months a refreshing aspect. Not so the coast

range: though visited indeed by occasional severe snow and hail storms, the extreme dryness of the air communicates itself to the barren soil, preventing the growth of any other pasture than the coarse grass which sustains the llama, alpaca, and vicuña.

This inhospitable region possesses, however, a class of vegetation worthy of remark: besides the *tola*, a low shrub from three to four feet high, which covers a great part of the plains generally, forests of *queñua* are met with, clothing the slopes of the mountains at heights of no less than 16,000 to 17,000 feet above the sea. This shrub, which reaches a height of from 10 to 14 feet, has a dense dark green foliage, the thick twisted trunk being of a light porous nature, but very strong and well adapted to resist the intense cold to which it is exposed.

Most of the streams which descend to the table-land, either discharge themselves directly into one or other of the great lakes Titicaca or Poopó, or unite their waters to those of the river Desaguadero which connects these basins.

Lake Titicaca has been navigated for several years by small steamers in connection with the Puno and Mollendo railway, and several proposals and some few attempts have been made to continue the navigation down the Desaguadero. As late as two years ago an expedition was sent by ex-President Pierola, under the direction of Colonel Billinghurst, to examine into the practicability of the scheme, the importance of which in a military point of view would probably, and commercially would undoubtedly, be of great importance. It appears that the river might without great expense be rendered navigable for light draught steamers, from Lake Titicaca as far as the confluence of the river Mauri, but from that down to Lake Poopó its course is much obstructed by sandbanks and part of its water becomes absorbed. At the point where I crossed it on the road from Oruro to Carangas it runs through a bed 285 yards wide with low banks a little more than three feet high; the stream however at the close of the dry season was only 70 yards wide with an extreme depth of 16 inches.

Lake Poopó itself, unlike Lake Titicaca, with the exception of the isolated hills of Pampa Aullagas at the southern extremity and the Cerro Chullayasi on the western side, is everywhere surrounded by low flat lands; its shore-line is therefore very variable, a slight rise being sufficient to inundate a considerable tract of country; as a result of this it is so shallow near the shore as to render a close approach to land nearly everywhere difficult.

At its southern extremity the lake has an outlet, the Laca-Ahuira river, flowing with a scarcely perceptible current through a bed some 30 yards wide, and having a depth of from 30 to 40 feet. At a distance of a mile from the lake the river disappears underground, reappearing three miles further westward, and thence continuing its course without interruption to the Salinas de Coipasa. On an open pampa to the south

of the river and a mile from the point where this latter disappears, there are two ponds some 60 yards in diameter, in which the water appears to be in violent ebullition, rising and falling from a foot to 18 inches; the water is however cold and tasteless, it being merely atmospheric air which is constantly issuing.

In order to account for the disappearance of its water, it has been supposed that Lake Poopó must necessarily have some subterranean outlet besides the river Laca-Ahuira, but from what I have been able to observe it seems evident that the absorption generally and the evaporation, which in this dry atmosphere is immense, are sufficient to counter-balance the supply which enters the lake.

The Laca-Ahuira river, traversing for some 50 miles the pampas of the table-land, enters, as already mentioned, and assists in forming the Coipasa Salinas. These, which I first observed from the heights above Sabaya, present a striking appearance, the salt plain extending thence towards the south and south-east, covering an area of some 400 square miles, its dazzling whiteness contrasting forcibly with the dark mountains which border it.

The river Llauca, one of the most considerable on the table-land and the largest which enters Coipasa, is a fresh-water stream, and forms a lake in the Salinas, the extension of which varies with the season of the year. The Isluga river is also fresh water, but that of Sabaya, Cariquima, and others are either brackish or salt. Among the neighbouring mountains of the Sillillica Cordillera are many extinct volcanic cones, the only exception here being the Isluga peak which constantly throws off dense masses of black smoke. The summits of these cones are frequently covered with deposits of sulphur and their upper slopes with queñua forests.

The barren region extending southwards from this through the Bolivian provinces of Lipoz and Atacama is the home of the chinchilla, whose rich fur is so highly esteemed. The animal is nocturnal, it burrows high up along the slopes of the mountains, and is caught with ferrets which drive it into nets.

At a distance of some 25 miles from the Coipasa Salinas, towards the south-east, but unconnected with these latter, commence the great Salinas de Garcimendoza, covering an area of some 4000 square miles. In the part I had occasion to examine, I did not meet any permanent stream entering the Salinas, and only at a few points, as in the neighbourhood of Llica and Garcimendoza, fresh-water springs along the edge.

The great Salinas, like Coipasa, consists of a white and perfectly level plain with a slightly saline efflorescence or incrustation near the border, which increases in depth till at the distance of a few miles the salt strata attain a thickness of from three to four feet. The surface is firm and may be crossed with safety on horseback in the dry season;

during the rains, however, it becomes soft and boggy where it is not absolutely inundated.

It might well be inquired how a salt plain of such considerable extent can have been formed by the insignificant amount of water which at present enters it. It appears, however, clear that these salinas, which are only separated from Coipasa by low flat lands, were formerly connected with this latter, and consequently with the great rivers and lakes of the table-land.

At the outset of my journey I had noticed a white and perfectly horizontal line running round certain spurs of the Oruro hills, which I at first supposed to be some stratified outcrop; on finding it, however, repeated in many places round the great Salinas and Coipasa, and on the southern border of Lake Poopó, I examined it with more care, and found it to consist of a calcareous incrustation on the volcanic rocks. This undoubtedly represents the ancient water-mark, and as it is everywhere at a height of 200 feet above the present level of Lake Poopó, the vast sheet of water then existing must have occupied some 20,000 square miles, and covered a great part of the Andean table-land, while possibly the gradual subsidence and escape of its water towards the Pacific may have had some share in the formation of the great nitrate deposits of Tarapacá and Atacama.

The geological features of the table-land present, as already noticed, some variety. The western ranges consist of a purely volcanic and trap formation, this is succeeded, going east, by a red sandstone region extending from Lake Titicaca along the line of the Desaguadero, and continuing in the hills south of Lake Poopó; this again gives place to the Silurian shales and slates of the Cordillera Real and its various spurs and ramifications. Volcanic rocks have however burst through the shale formation at many points, especially near its western border, as in Oruro, Poopó, Antequera, Colquechaca, and Potosi, and usually in such cases very rich metallic lodes are met with crossing the porphyritic rocks and the neighbouring stratified shales. As a mining region, certainly few parts of the world could compete with this were there any reasonable facilities for transport to the coast.

With the exception of the gold washings in various parts of the eastern Cordillera, the copper deposits of Corocoro, and a few of the richest tin lodes about Oruro and Potosi, silver is the only metal worked to any extent, the amount annually exported reaching a value at the present time of from eight to ten million dollars. The quality of the silver ores varies greatly; those containing as low as 0·3 per cent. leave a profit. The celebrated Huanchaca mines produce immense quantities of ore, containing some 0·7 per cent. of silver; the mines of Oruro produce ore which occasionally reaches, but seldom exceeds, 10 per cent.; in Colquechaca ores containing from 40 per cent. to 60 per cent. are common, while both here and in Potosi, Porco, and many other

mining districts, ores of 70 per cent. and 75 per cent. and native silver are frequently met with.

Ores containing from 1 per cent. to $1\frac{1}{2}$ per cent. and upwards of silver are more advantageously exported to Europe, in spite of the high freights by mules and donkeys to the coast. The present rate from Oruro (though one of the nearest points) to Tacna, terminus of the railway from Arica, is 15*l.* per ton. The copper, tin, and other metals contained in the ores are frequently sufficient, however, to pay the freight to Europe, while when treated in the country these are usually completely lost.

The silver is most commonly extracted from the ores treated here, by the process of stamping or grinding and roasting with common salt to convert the sulphides and other compounds into chlorides, from which the silver is subsequently extracted by amalgamation in revolving barrels or copper pots.

Metallie lodes are also met with, though with less frequency in the purely volcanic formation, as at Carangas and Negrillos, important mines at the time of the Spanish rule, and from whence very rich metals are said to have been extracted. Near Garcimendoza ores giving from 0.4 to 0.5 per cent. are abundant.

During the War of Independence these, like so many other flourishing mines in the country, were abandoned, and continued so for want of capital to reopen, dry, and place them in working order; while in others the extraction of the ore became at last impossible for want of any efficient machinery to drain them, or on account of insufficient ventilation due to the defective system of working. Some of these mines which of late have been reopened and drained by the aid of mule whims, have given excellent results, while the quality of the ore has usually been found even to improve with the depth. Indeed it is only within the last 10 or 15 years that the mining industry in Bolivia has commenced to revive; happily, in spite of the tedious and prejudicial war with Chile, it is now making constant and rapid strides. For this very reason, however, the necessity of railway communication with the Pacific coast is every day more urgently felt, and it is impossible to doubt that, on the conclusion of peace, an enterprise offering such a brilliant prospect to capital will soon be carried out.

From surveys recently made it appears that the Pica Quebrada, in lat. $20^{\circ} 32'$, is that which presents the least difficulty for the construction of a line of railway from the coast, the ascent here being sufficiently easy. Such a line would have for its terminus on the Pacific the port of Iquique, and might be continued directly from the present head of the railway at La Noria, this section, already constructed, being one of the most costly of the whole line, as surmounting the first steep coast range, and reaching an elevation of 3200 feet.

On arriving at the table-land, a branch might be carried either

directly across or round the south edge of the great Salinas to Huanchaca, and thence to the rich mining districts of Portugalete, Porco, and Potosi, while the other branch, keeping along the western edge of the Salinas to Llica, and crossing the low pass at that point, would enter on the great plain traversed by the Laca-Ahuira river, and ascending the course of this latter it would pass at a short distance from the Garcimendoza mines, continuing thence to Pampa Aullagas and the mining district of Oruro along the eastern shore of Lake Poopó.

With the exception of the ascent through the Pica Quebrada, the whole extent of this railway would be practically level, with an almost complete absence of bridges or anything exceeding the dimensions of a culvert; it would tap the heart of perhaps the richest mining district in the world, and from the first day of its opening it would enjoy an abundant traffic; while by the facilities it would offer for the introduction of machinery and all the necessaries of life, and for the transport of fuel and salt to the mining centres, it is no exaggeration to say that it would render not only practicable, but extremely profitable, the working of hundreds of mines at present lying abandoned.

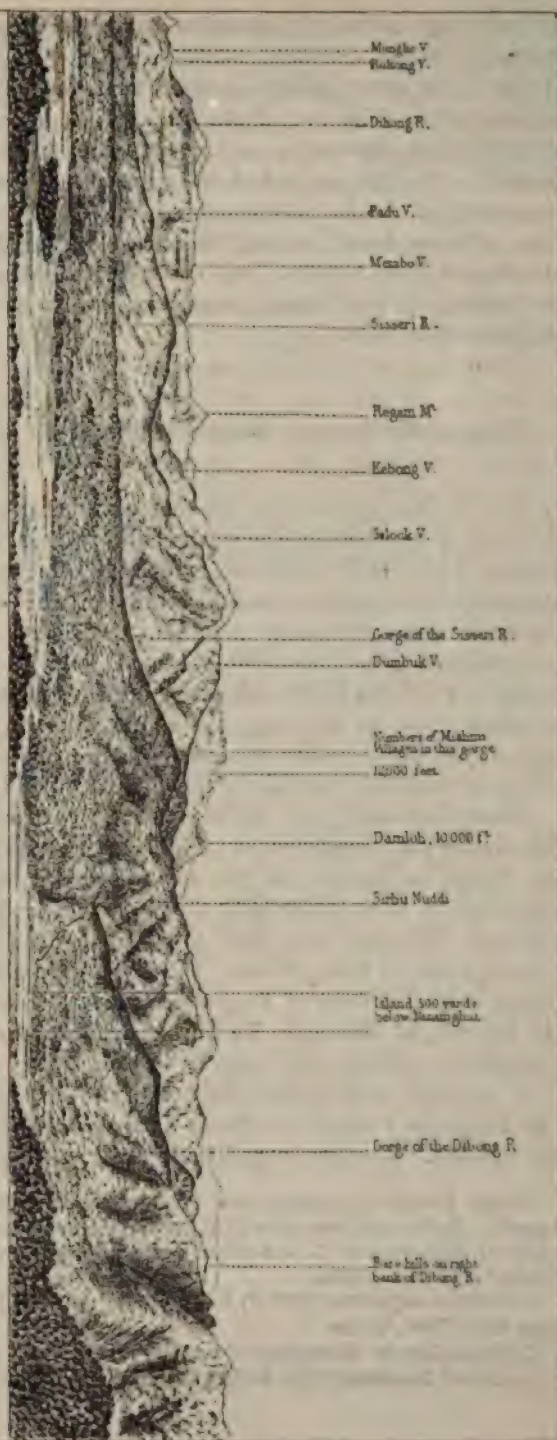
ORURO, BOLIVIA.

The Abor Country, on the Upper Waters of the Brahmaputra.

WE have received from Captain St. John Michell, of the Intelligence Department, Simla, a reconnaissance sketch, of which the adjoining is a reduced engraving, representing the aspect of the rugged mountain region on the upper waters of the Brahmaputra, in the hitherto inaccessible valleys of which lies the secret of the true course of the Sanpo river of Tibet. Captain Michell, in the note accompanying his drawing, says that if the Sanpo flows into the Assam valley, it must be by one of the two rivers whose site is indicated in the sketch, viz. the Dibong, or the Dihong; but recent surveys have approached so near to the sources of the Dibong that this river must now, to all appearances, be excluded from the question. The problem, however, is by no means solved by this fact, for Captain Michell states that the Abors maintain that their river (the Dihong) comes from the north-west, and not from the north, and is not the continuation of any great river. They will not allow strangers to enter their country, otherwise a view from the northern side of the gorge of the Dihong would probably settle the vexed question. No European has crossed the mountain barrier shown in the sketch.

Captain Michell appends the following explanatory remarks to his sketch:—The mountains shown on the right bank of the Dibong are 45 miles distant from that river, and opposite to Regam the Dihong takes a westerly turn. If this point could be reached by any European

INSTANT VIEW OF THE ABOR COUNTRY, FROM THE LEFT BANK OF THE UPPER JIBONG, LOOKING WEST.



or intelligent native, the question of whether the Sanpo and Brahmaputra are one and the same would immediately be settled. The gorges of the three great rivers are from 16 to 40 miles due north of the Brahmaputra. The bed of the Dibong is one to two miles wide, the river flowing due north and south. The Sisseri and Dihong flow parallel to the Dibong, and at their gorges are 8 to 10 miles apart, in a straight line. Damloh is distant from the Dibong 28 miles in a straight line, or three days' journey. Silook is eight miles from the Dibong. Membo and Padu are two important Abor villages on the low hills at the entrance to the Dibong gorge, the path to the villages lying along the base of the hills.

Work of the German African Association in Western Equatorial Africa.

It is now nine years since the German African Association undertook the task of penetrating the dark continent from its western side; and looking to the results achieved, it must be admitted that our colleagues have much to be proud of, and to be satisfied that the 22,000*l.* devoted to the work have not been spent in vain. The first expedition, under the leadership of Güssfeldt (1873-6) found itself planted on the Loango coast, north of the Zaire, and although the routes travelled by it make no great show on the map, the natural history, anthropological and meteorological researches carried on by the sharers in this first venture will ever remain invaluable to the student of African geography.*

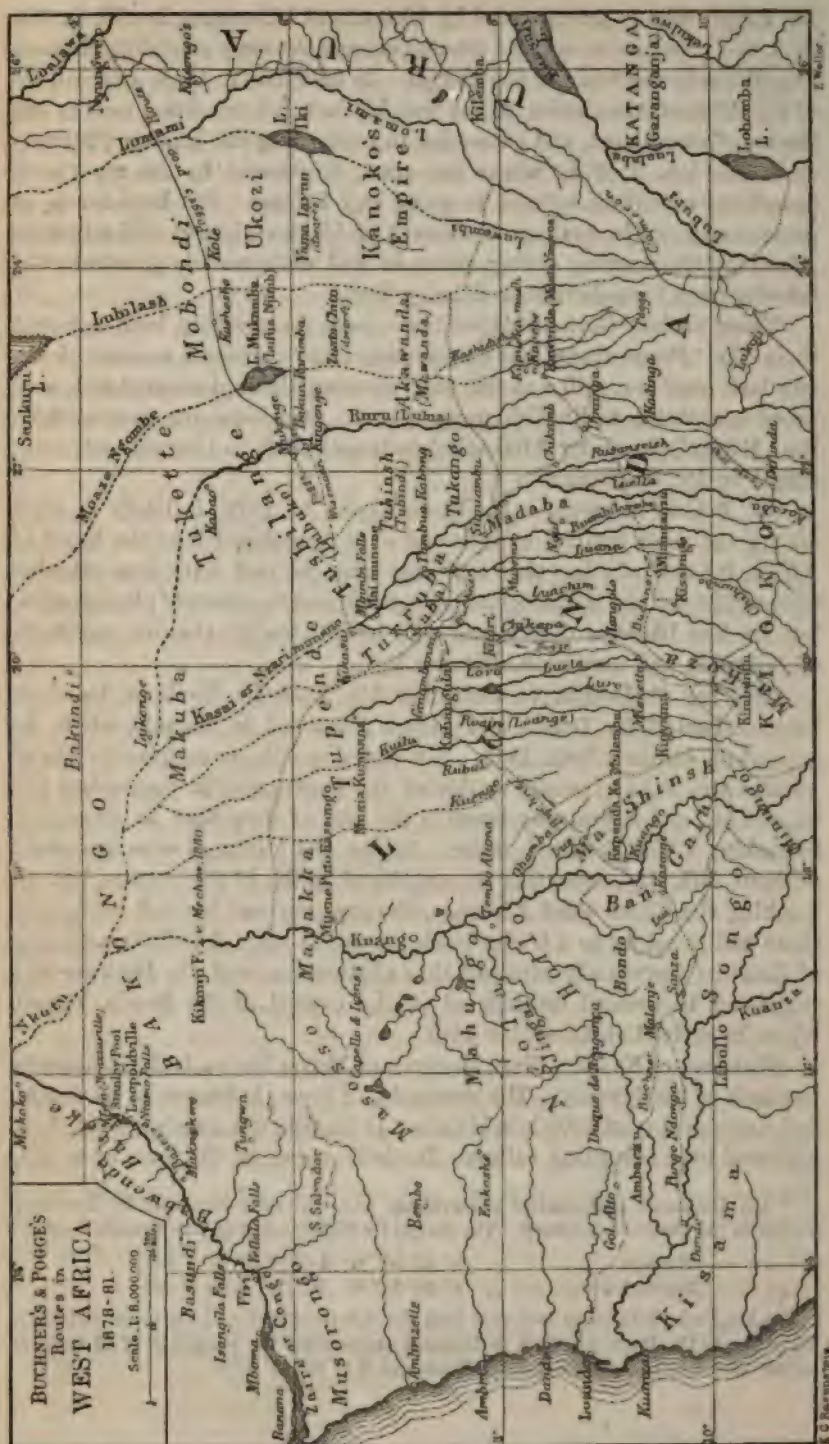
Since these early and expensive days of African prenticeships† the Association has despatched no less than five expeditions into the interior. Dr. Pogge, a member of the expedition led by Dr. von Homeyer, succeeded, in 1875, in reaching the capital of the Muata Yanvo, the first educated European who had ever done so.‡ This brilliant success naturally led to fresh efforts. Edward Mohr, who had been chosen to follow in the footsteps of Pogge, unfortunately died on the threshold of the interior, at Malanje. To him succeeded Otto Schütt (1877-9), who furnished a minute route survey of the country as far as the Chikapa river, together with an instructive diary.§ Buchner followed next, and like Pogge, he reached the Muata Yanvo's capital, where he resided for six months. The last expedition, under the approved leadership of

* 'Die Loango-Expedition,' von P. Güssfeldt, J. Falkenstein und E. Pechuel-Loesche. Berlin, 3 volumes, since 1879, have appeared, but the work is not yet complete, owing to dilatoriness of the last-named author. See also Falkenstein's 'Afrikanisches Album,' of 72 photographs.

† The first expedition (1873-6) cost 10,530*l.*; the second 4459*l.*; the four sent out since about 7000*l.* to date.

‡ 'Im Reiche des Muata-Jamvo,' von P. Pogge. Berlin, 1879.

§ 'Reisen im südwestlichen Becken des Congo,' von O. H. Schütt. Berlin, 1881.



Dr. Pogge, who is accompanied by Lieutenant Wissmann, is still in the field, and promises to attain a greater success than any preceding German expedition in the basin of the Congo. In addition to these expeditions of the African Association, Major von Mechow led one fitted out by the German Government, and succeeded in navigating the Kuango (Quango) as far as lat. $5^{\circ} 5' S.$, where the crew, frightened by the reports of imaginary cannibals, refused to go on any further. Dr. Buchner is at present engaged in writing an account of his travels, but will return to Africa in the ensuing spring, when he will endeavour to penetrate the interior from Leopoldville on Stanley Pool.

These various German expeditions have occasionally been referred to in the 'Proceedings,' but a somewhat more connected account of the two last, together with a sketch-map showing the regions explored, may prove acceptable to English geographers. Our facts are derived from the 'Mittheilungen der Afrikanischen Gesellschaft in Deutschland,' ably edited by Dr. W. Erman.

Dr. Buchner's *Journey to the Muata Yanvo*, in 1879, is likely to rank among the most fruitful expeditions ever despatched into the heart of Africa, for not only has that traveller brought back with him valuable natural history and ethnological collections, and an album of photographs, but he has likewise determined two longitudes by absolute methods, 67 latitudes, and numerous altitudes.*

Arriving at Loanda on December 5th, 1878, Dr. Buchner, ten days later, embarked for Dondo, and thence proceeded to Malanje, where he arrived on January 30th, 1879. Six weary months were spent in this at present the most advanced station of the Portuguese in organising the expedition, and it was only towards the end of July that he succeeded in making a start for the interior. Songo and Minungo were traversed without difficulty, excepting an occasional strike of the porters, but on reaching the Kioko chief Kissenge, the explorer was invited to remain there and to set up as a trader in slaves and ivory. A judicious display of firearms fortunately removed this obstruction, and Dr. Buchner was permitted to proceed unhindered to the capital of the Muata Yanvo, where he arrived on December 11th.

Shanama, or Naoësh a Gatt, the present Muata Yanvo, is the fourteenth monarch of his dynasty. His *mussumba*, or town, is known as Kawende, and contains at most 2000 inhabitants. It consists of a number of hamlets, scattered over a verdant valley. In their centre, on the spur of a hill,

* Dr. Buchner's astronomical observations were carefully computed by Professor Ferster of the Berlin observatory. The results for Malanje and Muata Yanvo's are:—

Malanje	$9^{\circ} 32' 36'' S.$	$16^{\circ} 10' 30'' \pm 4' 28''$
Muata Yanvo's	$8^{\circ} 24' 10'' S.$	$22^{\circ} 55' 0'' \pm 3' 9''$

The longitude deduced in each case from five sets of altitudes of the moon and stars. According to Dr. Buchner's own preliminary computation the longitude of Malanje is $16^{\circ} 37' 48''$; according to Lieutenant Wissmann it is $16^{\circ} 37' 49''$.

risers the *kipanga* or royal residence, rendered conspicuous by the huge conical roof of the *nsoff* or hall of audience.

The Muata is reputed to be cruel and avaricious. The latter imputation is true, no doubt, but Dr. Buchner is unable to endorse the charge of cruelty. He saw no people whose noses had been cut off or ears cropped, and during his six months' residence only three criminals were executed, two for "aggravated magic," and one of the king's wives for adultery. The number of executions would, however, be larger if it were not for the force of public opinion and the influence of the co-regent Lukoksha,* whose chief argument against the destruction of human life consists in the paucity of men in Lunda.

On December 11th, Dr. Buchner was admitted to his first audience. He entered the royal enclosure or compound through a gate roughly made of raphia poles, and defended against evil influences by a fetish consisting of a bundle of reeds and the horn of a palanka antelope. The skulls of about thirty criminals were stuck up on either side of the entrance. The large square within was very clean and is bounded by avenues of trees. At its upper end, in front of the *nsoff* or hall of audience, stood the throne—a rough seat of clay covered with the skin of a leopard. The king made his appearance from a group of fenced-in buildings in the background. He was followed by a band of drummers and marimba players, and supported by a crowd of courtiers and women. A murmur of loyal admiration ran through the crowd, whilst his majesty leisurely disposed himself upon his throne. He is a fine-made man, though decidedly ugly. His features are expressive of a certain amount of intelligence. His eyes, as a rule, piercing and venomous, are capable on suitable occasions of assuming an amiable expression. His teeth project like the tusks of a boar; his beard is limited to a few bristles on the chin. The royal forehead was shaved, but the remaining hair was elaborately dressed and ornamented with parrot's feathers. A blue cloth of flannel, fastened round the waist, was the only article of dress worn by the king, and left the upper part of the body exposed. A string of beads with an amulet, and a copper chain were worn round the neck, and rings round the legs and arms. Most conspicuous amongst these ornaments was the *rukann*, a stout bracelet made of human sinews, which is worn on the left wrist as the emblem of royalty. One lackey held a huge sunshade, a second assiduously plied a horse hair fan, and a third kept close at hand ready to cover over the royal expectorations with earth. Courtiers and royal favourites knelt in front of the throne; Moari, the favourite queen, sat behind it, and the Lukoksha, an elderly lady with bloated face and thick lips, was enthroned some distance to the left, in the midst of her women. A *kabila*, or royal gate-keeper,

* The Lukoksha is the successor, not the descendant, of the wife of the first Muata Yanvo of the reigning dynasty. She has her own court and territories, and exercises an undoubted influence upon the government of the country.

armed with a two-tongued whip of ox-hide, kept order amongst the surrounding crowd, but never interfered with the prowling curs which were allowed to freely circulate amongst it.

In order to impress Dr. Buchner with his power the king had arranged that one of the residents at the mussumba should disguise himself as a chief, just arrived from a distant part of the empire, to do homage to his sovereign. This personage was supplied for the occasion with soldiers and wives, all of whom approached the throne thickly plastered over with mud from head to foot. The sham chief approached his majesty on all fours, and then deliberately rolled himself in the sand. This ceremony over, Dr. Buchner had a private audience of the Lukokeshu. This lady is of as amorous a disposition now as she was on the occasion of Dr. Pogge's visit. She insisted upon Dr. Buchner sitting close beside her, and invited him to share in her potations; but as she was evidently tipsy, her favoured visitor thought fit to leave her abruptly.

The Muata Yanvo is certainly entitled to be called a king. The chiefs or *ilolos* who owe allegiance to him number about 300, and his empire is as large as all Germany. The number of his subjects, however, does not probably exceed two millions. Just now his power is threatened by the Kioko, famous as smiths, elephant-hunters, and men-stealers, who are gradually spreading from the Upper Quango to the northward, and already hold considerable territories as far as the Kassai and lat. 7° S.

But the commerce carried on within the limits of this empire is very insignificant. Traders arriving from the coast are required to deposit the merchandise they bring with them with the king, who then sends men into the more remote parts of his dominions and amongst the neighbouring tribes (all of whom are described as cannibals) to procure the slaves and ivory he is willing to give in exchange. This is naturally a very slow way of doing business, and only possible in a country where "time is not money." It is next to impossible for a trader to obtain permission to proceed into these interior countries himself, and no exception was made in favour of Dr. Buchner, who, after six months of vain negotiations reluctantly turned his face once more to the westward. During the homeward journey he made several efforts to pass beyond the boundaries of Lunda, towards the north, but was foiled on every occasion by the watchfulness of the frontier chiefs.* On February 8th, 1881, he was back at Malanje, where he met Pogge, Wissmann, and von Mechow.

The physical features of the regions explored are of exceeding simplicity. Having crossed the littoral region, a barren and waterless plain, with scant grass and a few baobabs and candelabra euphorbias, the traveller traverses a belt of mountains, and finally reaches the interior plateau, which forms a vast undulating savana, furrowed by numerous

* See 'Proceedings,' 1881, p. 370.

river channels, fringed by dense woods. On these uplands it rains during eight months in the year, from September to April; the rains, however, are not excessive, and only rarely interfere with travelling. The temperature during the rainy season varies between 63° and 81° F., but in the dry season it occasionally sinks down to 45° F., when the traveller is made sensible of the comfort to be got out of a warm blanket. The fauna is exceedingly poor, and game scarce. Dr. Buchner never saw an elephant or a lion; the rhinoceros or giraffe are quite unknown to the natives, and the only trace seen of a zebra consisted in a strip of its skin, which was looked upon as a great curiosity. The crocodile does not appear to exist in the interior. The only large game to be depended on is the hippopotamus.

The second expedition, respecting which a few details may prove of interest, is that of which Dr. Pogge took the lead. It was originally intended that it should proceed to Muata Yanvo's, there to establish a permanent station. Circumstances, however, frustrated the realisation of this design, and induced Dr. Pogge to strike out a new path, towards the north, which fortunately led him into regions not hitherto visited by scientific travellers, though frequented by the ever-present Portuguese ivory-traders.

Dr. Pogge and his companion, Lieutenant Wissmann, left Hamburg on November 18th, 1880, arrived at Loanda in the ensuing January, and on the 25th of that month found themselves at Malanje. Here they expected to be able to complete their outfit, but they found Custodio Machado's store empty, and it was only on June 2nd that they were able to proceed on their journey. The involuntary leisure thus afforded was employed by Lieutenant Wissmann in astronomical and meteorological observations, the main results of which are as follows:—

Malanje, Lat. $9^{\circ} 32' 45''$ S., Long. $16^{\circ} 37' 49''$ E. of Greenwich, Altitude 3580 feet.

	Mean Temp.	Mean diff. between max. & min.	Barom. (reduced to 32° .)	Force of Vapour. in.	Humidity.	Dew Point. F.	Rain. in.
February	73·36	15·3	26·35	·598	78	63·86	3·06
March	72·63	18·0	26·46	·560	65	62·06	4·83
April	72·27	13·0	26·38	·575	73	62·78	4·93
Rain in May, 0·40 in.							

Starting from Malanje on June 2nd, Dr. Pogge reached the Kioko chief Kimbunda's residence without difficulty on July 20th. He found that the road to Muata Yanvo's town was closed in consequence of a war which had broken out between that potentate and the Kioko, who are more firmly establishing themselves in his dominions from day to day, and begin to threaten the very existence of his empire. Dr. Pogge, under these circumstances, determined to turn to the north, and having heard favourable accounts of the Tusselange, he resolved to visit them. Having reorganised his caravan, notwithstanding the opposition offered by the

Kioko, who are naturally jealous of strangers desirous of penetrating into regions which they look upon as their particular "trading grounds," Dr. Pogge left Kimbunda's in the beginning of August, and travelling along the left bank of the Chikapa, where Kitari and the female chieftain Ginambanza made but a feeble show of resisting his progress, he passed beyond the limits of Lunda, and on October 2nd, after 44 days' march, found himself at Kikassa on the banks of the Kassai, in the Tupende country. The river here has a width of 300 to 400 yards, and is very deep. About a day's journey higher up, near Mai Munene's town, there is a great waterfall. At this place the expedition was ferried over to the right bank, where the Tusselange chief Kingengi was in waiting, and invited them to proceed to his town, instead of to that of his neighbour and former sovereign Mukenge. Dr. Pogge, however, adhered to his original intention, but deputed his companion, Lieut. Wissmann, to accompany Kigenge. On October 30th he reached Mukenge's village, a small place of about 1000 inhabitants, standing five miles to the west of the Lulua or Ruru, at the head of two streams, which supply excellent water.

The country between the Kassai and Lulua is undulating, and in parts even hilly. It is intersected by numerous rivulets running in deep channels, and generally fringed by a belt of forests. In the western part of this region forests predominate, and the villages and fields occupy clearings within them, but beyond this forest region the traveller enters upon a champaign country, covered with high grass. The soil is everywhere a red loam, overlying horizontally bedded sandstone, cropping out on the hill-sides and in the river channels, which are cumbered with boulders of granite. The flora presents nothing striking to the ordinary traveller, except perhaps the large number of forest trees, bearing fruit and berries. There are four species of palms, all yielding wine, and from the fibres of the leaf of one of them (the *mabonde*) the Tusselange weave beautiful cloth. Excellent pasture for cattle abounds, but only goats, pigs, and a few sheep are kept.

The fauna is very poor. The hippopotamus, small buffalo, and wart-hog are the only animals likely to attract the sportsman. Larger beasts of prey are rare. Lieut. Wissmann heard of an animal resembling a tapir. Birds are scarce, too, with the exception of grey parrots.

The climate is warmer than at Muata Yanvo's, but decidedly healthy. During one month's residence, in rather close quarters, not a single case of sickness occurred among the members of the expedition.

As to the Tusselange, they fully realised all that was hoped of them. They are proverbially kind to strangers, and are hence known among the Ambaquistas as *lubuko* or "friends." Provisions were procurable at reasonable prices, and no restraint is put by them on the movements of the travellers.

The older generation are still tattooed all over the body, but this fashion is disappearing, since intercourse with the Kioko has become more frequent. Agriculture is carried on with success, and manioc, maize, millet, beans, ground-nuts, and hemp are grown in large quantities, as also a little tobacco. The exports are confined to slaves and rubber. It is mostly the women who are sold into slavery, and an adult may be procured for 18 yards of calico, 4 lbs. of powder, or a musket. The country is divided among numerous chiefs, and each village forms a closely-knitted community, spoken of as *banu* or *bakua*.

Dr. Pogge intended to leave Mukenge's village on November 29th last, and the chief himself promised to conduct him to Lake Mukamba. He speaks very confidently of being able to reach Nyangwe, on the Lualawa, whence Lieut. Wissmann proposes to proceed to the east coast, whilst he himself would return to Mukenge's, where he intends to remain until December next, unless relieved before that time.

GEOGRAPHICAL NOTES.

The approaching Session.—The new Session (1882-3) of the Society commences on the 13th inst., the subject of the first evening being a paper by Mr. A. R. Colquhoun, on his recent journey through Southern China, from the mouth of the Sikiang to the banks of the Irawadi.—On the 11th of December, a paper will be read by Mr. A. P. Maudslay, on his recent explorations in Northern Guatemala, and discovery of the ruins of Usumacinta, an old Indian city, hidden in the forests of the river of the same name.—Mr. Leigh Smith will read a paper to the Society, on his winter residence in Franz-Josef Land, and the wreck of the *Eira* in January.—At one of the evening meetings Major-General Sir Henry Rawlinson will read and comment on M. Lessar's account of his recent railway survey from Askabad to Herat.

Reported great Lake west of Albert Nyanza.—The existence of another equatorial lake in Central Africa, far to the west of Albert Nyanza, rumours of which have reached Europe from time to time since Sir Samuel Baker's first journey, is again reported, this time in a much more definite form. Mr. F. Lupton, Governor of the Egyptian province of Bahr el Ghazal, writes to us from his station, Dehm Siber, on the 27th of July, to the effect that Rafai Aga, an employé under his command, on his return from an expedition towards the Welle, told him that he and some of the members of the expedition had seen a great lake in the country of the Barboa, a powerful copper-coloured tribe, clothed with a peculiar grass-cloth (of which Mr. Lupton sends a specimen in his letter). Mr. Lupton gathered that the position of the lake was in about 3° 40' N. lat., and 23° E. long., and that it was quite as large as Victoria

Nyanza. When the weather permits, the Barboas cross the lake in large open boats made out of a single tree, the voyage taking three days, and they obtain from the people living on the western side (their own country being east of the lake), articles of European manufacture such as blue beads and brass wire. Mr. Lupton adds Rafai Aga's own account of his route to the lake:—Started from Dehm Bekeer,* marched six days south-west to Zeriba el Douleb, then four days S.S.W. to Bengier; four days south-west to Zeriba Warendema; six days south-west by west to the Bahr el Makwar, which he crossed after visiting several very large islands inhabited by a people who call themselves Basango. The Makwar is called by the Arabs Bahr el Warshal, and joins the Uelle, but is a much larger stream; both flow in a W.S.W. direction. After crossing the Makwar, Rafai marched ten days S.S.W., and reached the residence of the "Sultan" of Barboa, by whom he was well received; the lake is situated four days' march to the south-west of the Sultan's residence. Mr. Lupton concludes by saying "I feel I should not be doing right in keeping dark this information, which when looked into by competent persons may throw some light on the famous Congo and Uelle rivers. I believe that the Uelle flows into the lake discovered by Rafai Aga, and that the stream which is said to flow out of the lake probably joins the Congo." Mr. Lupton further informs us that he is engaged in preparing a map of his province, and that he was about to start in a few days, on a journey to a country called Umbungu, some 15 days' march to the west of Dehm Siber.

Progress of Exploration and Settlement at Lake Nyassa.—We learn from Mr. Jas. Stevenson, the munificent promoter of the road-project from Lake Nyassa to Lake Tanganyika, that this important work has been resumed. Mr. Stewart, C.E., has made fresh arrangements with the chiefs and people, and in June last had 100 labourers at work on the road, eight miles of which had been constructed, commencing at Karonga,† on the shores of Nyassa. He had previously completed his exploration of the north-eastern shore of the lake, but had not succeeded in finding a harbour or site for a sanitarium along the foot of the mountain range.—Further south, and on the opposite side of Nyassa, Dr. Laws has been engaged in founding a station among the Angoni tribe (Angone or Mangone), on the cool and bracing highlands some 50 miles inland. The station is at Mombera, in lat. S. 11° 30', and long. E. 33° 38' 5'.

Recent News from Stanley Pool.—Our correspondent, Mr. T. J. Comber, writing from Ntombo, on the Congo, August 4th, informs us that he had just returned from a preliminary visit to Stanley Pool, undertaken for the purpose of arranging a settlement of the Baptist

* Visited by Schweinfurth. In lat. N. 6° 52', long. E. 26° 22'; conf. map, Schweinfurth's 'Heart of Africa,' vol. i.

† For map, consult 'Proceedings,' *ante*, vol. ii. p. 464.

Missions on a site granted them by Mr. Stanley near Leopoldville, the Belgian international settlement. Mr. Comber describes Leopoldville as pleasantly situated on the only hill in the neighbourhood, and within ten minutes' walk of Ntamo, a large and busy town, the residence of Nga-Liema, head chief of the Bateke nation. Ntamo, he says, is the seat of an important trade, and has a quarter set apart for the Bayansi people who come down the Congo from Chumbiri's towns, in their fleets of canoes, to sell their ivory to Nga-Liema, who in his turn sells it to the Bazombo, Makutas, and Babwende living further down. Mr. Comber is warm in his expressions of gratitude to Mr. Stanley for opening up a route to Stanley Pool by way of the river, he and his colleagues having striven in vain to reach the desired point by land from St. Salvador, the armed opposition of the native ivory-traders on that route proving invincible. He says the journey by the Stanley route, from Banana to the Pool, occupies twenty days, the stages being as follows:—1. Banana to Mussuca by Dutch steamer or mission boats; 2. Mussuca to Baynesville (a Baptist mission station 12 miles below the Kivile river) by road via Mpalabala, crossing the Mpozo and Luvu rivers; 3. Baynesville to Manyanga by river in the mission steel boat; 4. Manyanga to Stanley Pool by land, along the north bank as far as Inkissi Falls, and after crossing the Congo above the falls, by land along the south bank. Thanks to Mr. Stanley, communication throughout is constant and safe. The International Association has four stations and the Livingstone Mission three stations along the same line of route. The Bawumbu tribe south-east of Stanley Pool seem to be remarkably gentle and amiable, but the Bateke have the appearance of decided savages, their cheeks (chief and people alike) being seamed with long scars, their eye-brows shaved, eye-lashes plucked out, and a circlet of red and yellow pigment surrounding each eye. Mr. Comber speaks highly of Mr. Stanley's mode of dealing with the natives; his tact, kindness, and firmness with chiefs and people having, without a single hostile encounter, satisfactorily opened up this grand highway.

Bishop Steere.—This eminent pioneer and director of missionary work in Eastern Africa, died at Zanzibar of apoplexy, on the 27th of August. His loss will be deeply felt, not only by the Universities' Mission in that region, but by all who are interested in the cause of civilisation in Africa. He was a skilled linguist, a thorough master of Swahili, the language of the East Coast, and his achievements as a traveller were of no mean order; his journey to the eastern shore of Lake Nyassa, described in his modest little volume, 'A Walk to the Nyassa Country, 1876,' being a remarkable undertaking, in the uncertain temper of the tribes of the interior at that time. No one but Livingstone had preceded him in that region, and the routes of Bishop Steere were mostly new. The results of the 'Walk' were eminently practical, like the man himself, for the establishment of the successful

missionary station at Masasi, whence so many interesting journeys of exploration have since been made by the Rev. Chauncey Maples and others, soon followed the Bishop's visit.

Voyage of the 'Kara' and other Arctic Expeditions.—We are now able to announce the safe return of the *Kara*, and to give some further details of her adventurous and interesting cruise. The *Kara* left Matotchkin Strait on the 9th of August, with the intention of working along the western coast of Novaya Zemlya in a northerly direction, and on August 12th found ice to the north-west and north. As a fog was coming on it was deemed expedient to seek shelter behind Berg Island—lat. about $75^{\circ} 50'$. There was then fast ice between the islands north of Berg Island, which is unusual at that time of year, but no ice between Berg Island and the mainland. On the 14th, however, the wind freshened from the westward, and ice began to drive into the Sound. At first the ship was sheltered by a projecting point, but was soon surrounded by ice, and after losing a bower anchor and chain, as well as a kedge anchor and hawser, she was driven helplessly up the Sound, during the 15th and 16th, towards a small rocky island at the north-east entrance—the Tern Island of Captain Markham. There were several small grounded bergs to leeward, and another berg to windward, which was rapidly gaining on the ship, coming straight towards her. On the whole, matters looked so serious that provisions and clothes were ordered on deck in case of accident. At last the ship became stationary to windward of a flat berg, and the berg which was following her passed by and grounded in shoaler water. The vessel was then in her turn driven with great rapidity towards this grounded berg, which just grazed one of the boats at the davits, and caught the bowsprit end. The *Kara* now lay in comparative safety, being made fast to the grounded mass by a hawser, but soon afterwards a heavy lump struck her on the bow, causing the hawser to break off the ice to which it was secured, and she was again carried along, until, after much difficulty, she was brought up behind a small piece of grounded ice, some 100 yards from the south-west point of Tern Island. Provisions were at once landed in case of accident to the ship, and on the 17th and for many days following, the crew were employed in collecting drift wood and building a house. All this time the Sound was completely filled with ice, and escape seemed to be impossible unless the wind shifted to an easterly quarter; until August 30th, however, it almost invariably blew from the westward. On the 29th, Sir Henry Gore-Booth climbed to the top of Berg Island, and seeing the pack more open to the south-west and west ordered all the provisions on board again, on the chance of the ice opening in the Sound. This was hardly accomplished when a violent storm sprang up from the southward, causing so much ice-pressure that the ship was driven ashore. All provisions and stores had therefore to be landed again, empty casks were lashed under the bilge of the ship, and by great exertions she was

again got afloat, and finally escaped from the Sound on September 3rd, reaching Hammerfest on the 16th. One of the walrus boats was unfortunately crushed against the ship's side by a piece of ice during the gale, but the vessel herself sustained no damage except that a portion of the bulwarks was stove in. During her imprisonment snow fell almost continuously, and the temperature was generally sufficiently low to freeze any small patches of water between the floes. Quantities of looms were seen in the Sound before the ice came in, after which they nearly all disappeared. A few seals were shot, but little else was seen, and no bears were met with. After leaving the Sound, ice was seen to the westward trending about W.S.W. and E.N.E., as far down as Admiralty Peninsula, when it appeared to take a more westerly direction. On September 6th, the *Kara* fell in with the *Willem Barents*, and Sir Henry and Mr. Grant exchanged visits with the officers. They reported that they had been unable to get beyond 76° N. lat., and that about the meridian of Wiche's Land. The ice was unusually low down in every part of the Barents Sea. The *Willem Barents* reached Hammerfest on the 21st of September.—The *Louise*,* which has now returned to Europe, has confirmed the rumours of the ill-success attending the *Dijmphna* and *Varna*† up to the 22nd of September. After failing in their attempts to force a passage through Matotchkin Strait, all three vessels succeeded in entering the Kara Sea by way of the Jugor Strait, and were beset some 80 miles to the eastward. The *Louise*, however, was more favourably situated than the other vessels, and stayed by them for two days, in the hope of being able to render some assistance. But on September 22nd it became evident that Captain Burmeister would only endanger his own ship by remaining longer, and he therefore felt bound to make good his escape. From this report it is to be feared that there is small chance of the *Dijmphna* and *Varna* being able to avoid the well-known dangers of wintering in the pack. When last seen by Captain Burmeister they were in lat. $70^{\circ} 15' \text{ N.}$, long. 64° E. The voyages of the *Kara* and *Willem Barents* are of special value and importance as they leave little room for supposing that the steamers would have been able to enter the Kara Sea to the northward of Novaya Zemlya, where in ordinary ice-years open water is sometimes found when all the southern entrances are blocked.

Voyage of the 'Pola' to Jan Mayen.—Captain Müller, of the Austrian Expedition in the *Pola*, has sent to Sir Allen Young a detailed account of his voyage and the landing of the scientific party who are to work the International Meteorological Station on Jan Mayen. It corroborates what we have already published in previous numbers of the 'Proceedings.' His first attempt to reach the island, made too early in the season, contrary to the advice of Sir Allen Young, the value

* See *ante*, p. 607.

† *Ib'd.*

of whose information regarding the ice-conditions of the Greenland Sea he thankfully acknowledges, failed, as is well known. His second attempt a month later was successful, though many difficulties had to be overcome before the party was finally landed. He sighted the imposing crater of the Beerenberg on the 27th of June, and on that day approached the land to within 22 miles, but all his attempts to reach a harbour in various directions, on that and many subsequent days, were frustrated by the ice, and it was not until the morning of the 13th of July that he came to an anchor. This was in Mary Mass Bay, off the Vogelberg. The landing of the stores and instruments, weighing nearly 200 tons, was begun immediately, and continued day and night until completed, the work being much facilitated by the stranded ice; but the ship was in continual danger during the whole time, from the strong ice-laden currents produced by the tides, and steam had to be kept up in readiness for leaving the anchorage at a moment's notice. Several times the ship had suddenly to get up anchor and escape to the open sea; once, on the 19th, when she had to force an ice-barrier to get clear, and three times in August, whilst taking in ballast for the return voyage. The *Pola* left on the 16th of August, leaving the staff of observers established in well-furnished houses and comfortable for the winter. A good series of soundings were taken off the island, full particulars of which will be in due course communicated to the Admiralty by Captain Müller.

American Polar Expedition at Lady Franklin Bay.—The steamer *Neptune*, which was chartered by the American Government to take supplies to the scientific expedition under Lieutenant Greely in Lady Franklin Bay,* has returned to St. John's, Newfoundland, having been unable to get further north than $79^{\circ} 20'$. Lieutenant Beebe, who commanded the relief expedition, reports that the *Neptune* reached Godhavn on the 17th of July, and after taking on board various articles of native manufacture, proceeded northward until the 24th, when she was fairly beset near Cape York, and drifted helplessly for four days. On the 28th, the ice opened somewhat, and the ship was again able to work slowly northward, but was again stopped on the 29th by an unbroken ice barrier, which extended right across Smith Sound from Cape Inglefield. She therefore anchored in Pandora Harbour, and was detained there by heavy south-westerly gales. During her detention, a record left by Sir Allen Young was discovered near the water's edge, having been washed down from a cairn on the summit of a low point. On the 9th of August, the *Neptune* was beset by heavy ice 12 miles from Victoria Head, and but for the smaller and softer ice which formed a protection to the hull, must inevitably have been crushed. As it was she was raised bodily three feet, and was not released until the 12th.

* See *ante*, p. 232.

On the 18th, a record left by Sir George Nares was discovered on Brevoort Island, and a small depôt of provisions from the *Discovery* was found in fairly good condition on a neighbouring island. By the 25th, there were many signs of approaching winter. The vegetation was faded and brown, the flowers had disappeared, the ducks had taken their departure, and the summits of Cape Kenrick and the Crystal Palace Cliffs were covered with snow. So as the advancing season precluded all hope of reaching Lady Franklin Bay, Lieutenant Beebe decided to land the stores and boats as far north as possible, and caches were accordingly established on Cape Sabine and Lyttelton Island, the presence of a hunting party of Etah Esquimaux necessitating extra precaution. A whale-boat was also left on Cape Isabella, and Lieutenant Beebe considers that, should Lieutenant Greeley's party reach Cape Sabine next year before the arrival of the relief ship, they will scarcely fail to find the depôts. On the 4th of September, new ice formed to a thickness of four inches; and as the engineer reported a leak in the boiler, and the officers unanimously considered that further delay would not only be useless, but extremely hazardous, Lieutenant Beebe reluctantly gave orders to turn the ship's head towards home. The highest point attained by the *Neptune* was 12 miles from Cape Hawkes, and 17 miles from Cape Prescott.

Death of Franz Wittl in North Borneo.—A circumstantial account in the *Daily Telegraph* of the 11th ult., received from Singapore, leaves no room for doubting that this energetic traveller was treacherously murdered, by Muruts or Tanjoeing Dyaks, with several of his native attendants, while making his way to the head of the Sibuco river, the southern boundary of the territory of the British North Borneo Association, in whose service he was engaged. His former journeys, from Marudu Bay in the north of the territory to Papar, round the eastern slopes of Kinabalu and to Sandakan (during which he effectually disproved the existence of Lake Kinabalu), and from the same point northwards to the upper waters of the Labuk, and eastwards to Sebangau, have been noted in detail in our 'Proceedings' for February last (pp. 117 and 118). Mr. Wittl, a Hungarian by birth, was formerly a Captain in the Austrian Imperial Navy, of considerable scientific attainments, being a contributor to the service Manual of his country; before sailing for Borneo he availed himself largely of the resources of our Society (to which he came with good introductions from Vienna), both in the library and map room; and if he had lived would have doubtless fulfilled his promise to communicate in return for the preliminary aid received, any geographical facts of importance which he might have been at liberty to publish.

Major Holdich on Indian Frontier Surveys.—Major Holdich, well known for his surveys in Afghanistan during the late war, in a lecture

recently delivered at Simla emitted some suggestive views on the subject of frontier surveys. Speaking of the present frontier west of the Indus, he is emphatically of opinion that it is not a "haphazard" one. The present demarcation, coinciding as it does with the transition from the cultivated land to the stony and barren highland beyond, he considers to be an excellent natural boundary. Although here and there it might be advantageous to secure the summits rather than the bases of the boundary hills, so as to ensure a better watch over the border, it would be of little use to do this where there are ranges of hills like steps rising one behind the other, and where consequently nearly every exalted position would be commanded by one higher and further inland. To hold both ends of all the numerous practicable passes which intersect the border between Peshawar and the sea would be simply impossible on account of the magnitude of the task. There are, however, two weak points on our frontier, viz. where a promontory of Jowaki land about 12 miles wide, juts out into our territory between Peshawar and Kohat, and, secondly, further south, where the direct road from Thal to Bannu, which approximately follows the line of the Kurram river, is cut off by a sort of reversed bastion of Waziri country stretching into British territory in the neighbourhood of Bahadur Khel. The rough wilderness of hills in Jowaki and the Kaffir Kot peak and the rugged hills and spurs surrounding it are both strong vantage points for marauders and border ruffians, and in war time these two points constitute a serious weakness in an otherwise scientific frontier. Turning attention to the less known passes, one notices that immediately opposite Bannu there is a direct route following the course of the Tochi river, through the Dawar Valley, then across the Paltu Hills, and over fairly open ground to Ghazni. The Tochi Valley is, generally speaking, an open, well-cultivated, and fairly wide valley, full of big villages and easy gradients, so far as has been seen, while the pass over the Paltu range is several thousand feet lower than the Shutargardan. There are several passes between Dera Ismail Khan and Jacobabad which are worth examination on account of the connection which we know exists between them and the Zhob Valley route from Pishin, now thoroughly explored, and the Bori and Thal-Chotiali routes a little further south. Another route, nearly wholly explored, is the direct route from Kandahar to Dera Ismail via Maruf and the Sharan river, a tributary of the Gomul. In order, however, to complete the mapping of the region, fixed points are much needed south of Waziristan, and the Takht-i-Suliman offers a good opportunity to a surveyor, who could easily ascend it under permission from a local chief, and so secure an admirable position whence to tie together and close the whole triangulation. Southward of Thal-Chotiali there are many routes and passes lately traversed by our troops, and now well known. Major Holdich recommended the engagement of small local chiefs with a thirst for adventure, or travelling

priests, or any sort of people already accustomed to travel and with sufficient intelligence to read and write, as native explorers, who should map out the trans-frontier tracts now closed to British officers. In conclusion, he urged that a closer connection should be established between the Survey and Intelligence Branches with a view to mutual assistance and to improvement in the quality of the work which more properly belongs to one or the other.

The Burma-Manipur Frontier Survey.—We glean from a communication in the Allahabad *Pioneer* some interesting details regarding the measures taken last season to define the boundary line between Manipur and Upper Burma, a step rendered necessary by the raids of the Chins or Kukis, a tribe who have lately settled in the country north of the Kobo valley.—When the Kobo valley was retransferred from Manipur to Burma, the boundary was laid down in 1834 by Captains Grant and Pemberton, in concert with an official from Ava, but as the tracts north of the Kobo valley were uninhabited, and the neighbouring hill-tribes savage and unruly, these were left unsurveyed, and an approximate boundary drawn north up to a range called Sheriferar. It had become necessary to decide exactly how this line ran in order to know on whom would fall the responsibility of keeping the Chins in order in future. The demarcation party was composed of Colonel Johnstone, c.s.i., Boundary Commissioner, Mr. R. Phayre, Major Badgley, and Mr. Ogle of the Survey Department, Dr. Watt, medical officer and botanist, two other officers and a geologist, and 250 men of the 12th Khelat-i-Ghilzai Regiment and Frontier Police.—The party arrived in Manipur by the end of November. Manipur covers a large area of ground, each house having a separate compound. The city proper, or inner city, occupied by the rajah and his attendants; is quadrangular, and surrounded by moat and rampart like Mandalay. The people are like the Burmese in feature, but the male dress is the dress of the native of India, and they are strictly orthodox Hindus in religion. Two survey parties under Major Badgley and Mr. Ogle were despatched by southerly and northerly routes respectively, while the main party under Colonel Johnstone made its way to Kongal-thanna at the head of the Kobo valley, where the return of the survey parties was awaited. Mandalay having declined to send a representative, the task of defining the boundary was performed *ex parte*, with assistance from the Burmese frontier officials. The Kobo valley, as seen from the Yoma range, presented the aspect of a vast expanse of primeval *sal* forest, with clearances here and there, as it did to Pemberton, nearly 50 years ago. The large Burmese armies formerly stationed here to invade Manipur have given place to small villages of Shans, cultivating rice and manufacturing salt. The Shans of the Kobo valley are descendants of an ancient race whose records go back as far as the 80th year of the Christian era, and whose territory once extended from the Assam valley to the 22nd parallel, and from the Yoma range to Yunnan.

Outlying provinces were made over to princes of the blood royal, and these have given place to Tsaw-bwas, or petty rajahs, some of whom exist to this day, and are tributary to Burma.—In the survey of the Kabo valley observations were taken from both sides of the valley, but an attempt to place survey parties on the Ungochin hills, bounding it on the east, was opposed by armed retainers of the Thoung-thwoot Tsaw-bwa. The *rencontre* of Burmese and Manipuris, with the pent-up hatred of more than a century, was fortunately prevented from developing into a conflict by the presence of Colonel Johnstone's troops. The Colonel, wisely determining to avoid a rupture, despatched Mr. Phayre with Major Badgley to endeavour to come to an understanding with the Tsaw-bwa, and obtain permission for the survey party to take observations from the Ungochin hills. From their summit Mr. Phayre obtained a good view of the Chin-dwin valley (Namionai, or Kyen-dwen, in the most recent Indian Survey map). North and east are the Shan districts of Wintho, Mein-gein, Mein-nyoung, and in the far distance, overlooking the Irawadi, Mogoung. North are the amber mines and serpentine quarries of Kanti, and east and south are the auriferous streams flowing into the Chin-dwin river. East of the same river are the teak forests now worked under a lease by the Bombay Burma Company. Tea grows abundantly, but the leaf is pickled and eaten with a mixture of oil, garlic, and assafœtida. It is not used as a beverage.—Mr. Phayre duly arrived at Thoung-thwoot, on the banks of the Chin-dwin, and had a formal interview with the Tsaw-bwa, who came in state attire with an imposing procession of priests, [ministers, secretaries, troops, and retainers. This authority was however unable, in the absence of orders from Mandalay, to permit any survey parties to enter Burmese territory. Mr. Phayre accordingly went on to Tamoo to interview the Woon, a sort of frontier commissioner on the upper Chin-dwin, with extensive jurisdiction, with the hope that he would make proper representations at Mandalay, but] this step was equally ineffectual.—In passing through the southern part of the Kabo valley Mr. Phayre found that several districts and villages have been depopulated by the raids of the Chins, which are increasing in boldness and frequency every year. In 1879 a Burmese Woondonk, with 1500 troops, was sent up the Chin-dwin in a royal steamer, but rocks and boulders were hurled on his soldiers, who fled precipitately. In 1856 the Manipuris organised an expedition against the Chins, which failed disastrously, owing to defective commissariat arrangements. The British expedition against the Lushais is the only successful one on record.—The survey arrangements were concluded, and the party returned to Manipur by the end of January, work having been not a little facilitated by the steady and manly bearing of the 12th Khelat-i-Ghilzai troops under Lieutenant Angelo.

Exploration of the Upper Cuyuni.—Mr. Michael McTurk (a Government official of British Guiana, whose name will be familiar to readers of Boddam-Whetham's 'Roraima') has in the recently published first part of vol. i. of *Timchri*, the Journal of the Royal Agricultural and Commercial Society of that colony, given an account of a journey up the Cuyuni in the autumn of 1880, the last 30 or 40 miles of which would appear to have been through country whereof no printed description exists. There is indeed so little material available with reference to the geography of the region over the Venezuelan frontier, that Mr. McTurk's paper can scarcely fail to be of value. The longest journey up the Cuyuni appears to be that of Mr. W. Hilhouse, recorded in our Journal for 1837 (vol. vii. pp. 446-54). This explorer reached the mouth of the Ekruyeku or Cura Cura river, about $61^{\circ} 10'$ W. long., a point nearly the same distance short of Mr. McTurk's furthest as it itself exceeds the most westerly point on the river touched by Schomburgk (viz. the mouth of the Acarabisi, only a short distance over the frontier, see R.G.S. Journal, vol. xii. p. 178). A more modern traveller, Mr. Barrington Brown, only reached the mouth of the Otomong, on the boundary line.—Mr. McTurk started from Kalacoon (the "Calicoon" of Hilhouse) on the Mazaruni on October 14th, 1880, reaching Warriri, the old gold-mining locality on the Cuyuni, on the 16th, and the portage of Wohmopoh (probably the "Wohmiupong" of Walker's map) on the 23rd. Here he first met Indians, some Ackawois from the head of the Yuruari, who preferred to spend their earnings at Georgetown, in spite of the long and dangerous river passage, rather than at Cayou or Caratal. On the 26th, the first Carib settlement was reached, above Timoonie Falls, another one called Koratoka (the Cock) being seen on the opposite side of the river. On the 28th, three more Carib settlements were passed, one named Arra-outa (the Baboon), and the mountains Akare-coo-tepoo and Anakare-ye-tepoo were first observed. These mountains, with another called Tirimbandaboo, were passed next day on the left; they are of sandstone, and of similar formation to those on the Potaro and near Roraima, flat-topped, with precipitous sides, the bare red sandstone being exposed in many places. The last Carib settlement on the Cuyuni, called Apo-ye-kifoo (the place burnt by fire), was passed on the 29th, but a long way above, others were reported of Ackawois and Kamaracotas, and on November 3rd, Mr. McTurk entered the Yuruari, which flows into the Cuyuni from about north-east, each river being 300 yards wide at the junction. Mr. McTurk calls this the "Urawan," obviously the same as Codazzi's northern affluent "Yuruan," both from position, direction, and phonetic resemblance, but not to be confounded with the extension of the Cuyuni, which also appears as Yuruan on the maps of Codazzi and Walker, flowing in a westerly and north-westerly direction to about $6^{\circ} 48'$ N. lat., and then turning south-west and west to its supposed origin at about $6^{\circ} 5'$ N. lat. For the great

northern affluent entered by Mr. McTurk, Walker rightly adopts the name Yuruari (Hilhouse's "Yuruary"), which flows past the Caratal gold mines at Nueva Providencia, as described by Mr. G. Attwood in the 'Quarterly Journal of the Geological Society,' vol. xxv. p. 585.—The waters of this river were found to be white and muddy, but left no sediment after subsidence. After a day's journey up it, the larger boat used by the traveller could not be got any further, the river being filled with great boulders of granite 40 or 50 feet square, with small rills of water running between. During the rains there is a considerable fall here, called Rurreewa, on two of the rocks of which are drawings of frogs, about nine inches long, apparently made by friction with some harder substance, and about a mile above is another frog-drawing, somewhat different. These are called Parrah-coosa (from "Parrah," a frog) by the Ackawois, who know nothing of their origin, except that they are ancient. The smaller boat was carried over the Rurreewa rocks, and the exploration was continued for another day, considerable portages being often necessary. Some Ackawois' houses were seen, one of the inhabitants of which spoke Spanish, and on the last day (Nov. 5th) a landing apparently of some importance was arrived at, from which a path led by a two days' journey over the Savannah to Cayou, the nearest Venezuelan town or village. About a mile on this path from the landing is the nearest house, known as Francisco's, after which the Savannah is open and undulating, with clumps of trees several acres in extent here and there; and where the grass had not been burnt off it was six feet high and excellent as pasture. The numerous Venezuelan houses scattered about were very similar in structure and material to those of the Indians, but some were partly enclosed, the rough doors and windows being of raw deer-skins. The people seemed of mixed Indian and Spanish blood, neither white men nor black being seen; and they live like Indians, cultivating cassava and plantains, grazing a few cattle, or mining. The land up the Cuyuni seems lower than that of the Essequibo and Mazaruni, but is more fertile, there not being so much sand in it, so that grass springs up wherever a large tree falls or a small clearing is made. The forest trees above the Payuca Falls (near the old Warriri gold-mines) are different from those on the lower reaches, and bamboo grows all along the sides of the river from that point to the mouth of the Yuruari. Mr. McTurk started on his return voyage on Nov. 5th, and reached Kalacoon on the 18th, after five weeks' absence.

A Scientific Journal in British Guiana.—The new Journal alluded to in the foregoing account of Mr. McTurk's explorations derives its name *Timehri* from a Carib word signifying the old writings on the rocks of British Guiana, a specimen of which hieroglyphics is given on the cover. It is a well-printed magazine of 172 pages. The editor, Mr. E. F. in Thurn, M.A., late Curator of the Museum, says, in his introduction of the new publication, "Every effort will be made to

render the journal, though its subject matter will be Guiana, widely interesting to scientific and other readers both within and beyond the colony," and probably much useful experience will thus be made available to others, which would otherwise have been confined to one or two specialists. The first part contains nine articles on various subjects of interest in connection with the colony, besides occasional notes and reports of meetings. The London publisher is Mr. Stanford.

Obituary.

Commander Wyatt Rawson, R.N.—The death of Wyatt Rawson will be felt as a serious loss in the Navy, and by his numerous friends in this Society; for there are few men who, during so short a life, have given such great promise, or who have formed so many and such warm friendships. He closed a remarkably active and distinguished career by a glorious death.

Our lamented Associate came of an ancient stock, the Rawsons, formerly Ravenshills or Ravensons, having been settled in the valley of the Aire, in Yorkshire, before the Norman conquest. He was the youngest son of Christopher Rawson, Esq., and of Ellen Frances, daughter of John Naylor Wright, Esq., of Beaumaris, and was born on August 27th, 1853. His elder brother, who is ten years his senior, is also a naval officer of distinction. Captain H. H. Rawson, R.N., held the responsible post of superintendent of transports during the Egyptian campaign.

Young Wyatt passed some of his early years in Canada, where his father held an official position, and his boyish experience of sledging and ice work proved useful to him afterwards. He entered the Navy in 1866, and enjoyed the great advantage of serving his first apprenticeship under our lamented Associate Captain J. G. Goodenough, in the *Minotaur*. His next ship was the *Narcissus*, commanded by Captain Codrington, in the flying squadron. On his return he passed for a lieutenant with credit (1. 1. 2.). During the Ashanti war he belonged to the *Active*, Commodore Hewett, and distinguished himself in the march to Kumasi with the Naval Brigade, receiving a bullet wound in the thigh at the battle of Amoafu, in January 1874. He was mentioned in despatches for the energy and tact he displayed while serving with the Land Transport Corps. He was specially promoted to the rank of lieutenant on the 31st of March, 1874, at the early age of 20, for his Ashanti services.

When it was decided that Arctic discovery should be resumed through Government agency, young Rawson was one of the foremost and most eager of the volunteers, and he was appointed third lieutenant of the *Discovery* in April 1875. At the same time he was elected a Fellow of this Society. When Lady Franklin Bay was selected as the winter quarters of the second ship, while Captain Nares pushed northwards, it was arranged that an officer should be taken on board the *Alert* to return to the *Discovery* as soon as practicable, with news of the final wintering position of her consort. Rawson was selected for this important service, and he accordingly joined the *Alert* with a sledge crew on the 26th of August, 1875.

It was not possible to return to his own ship before the winter, although he made a persevering attempt to do so from the 2nd to the 12th of October. The point he reached is named Cape Rawson. But water was making close in shore, and he and

his sledge crew were obliged to winter on board the *Alert* in latitude $82^{\circ} 27' N$. Rawson was a great acquisition, and his cheery, helpful companionship will continue to be a bright memory to his shipmates for the rest of their lives. An Arctic winter loses all its horrors when its long, dark hours are cheered and brightened by the joyous gaiety and steadfast devotion to duty of such spirits as Rawson and his young comrades.

The first service to be performed on the return of the sun was one of no slight difficulty. It was to open communication between the *Alert* and the *Discovery* during a time when the mean temperature was 30° and the minimum 45° below zero. The heroes of this memorable exploit were Lieutenants Egerton and Rawson, who were accompanied by the Danish dog-driver Petersen and nine dogs. Starting on the 12th of March, 1876, Petersen was frequently frost-bitten, and on the 14th a strong wind made it impossible to travel. The man was very ill and nearly frozen. His two companions dug a hole in the drift, and removed poor Petersen into it. This took them six hours; but the sufferer was still in acute pain, and there appeared to be no heat in him of any kind. They chafed his hands and feet, covered him with everything warm, even depriving themselves of some of their own clothing, closed every crevice, lit the spirit-lamp, but only succeeded in getting the temperature up to 7° . Still the patient's feet and hands remained hard and frozen. "So each taking a foot, we set to work to warm them with our hands and flannels. As each hand got cold, we warmed it about our persons, and in about two hours we restored the circulation." This was repeated again and again through the night; and next day they resolved to attempt to bring the man back to the ship. The difficulties and miseries of the return journey were increased by the incessant care required for the patient. At one point the dogs made a sudden bolt past Rawson, who held on to the harness and was carried along with them. On his grip depended poor Petersen's life, but it was a grip of iron. At 6.30 the same evening they arrived alongside, and so their poor patient's life was saved. They were received with heartfelt rejoicing, and Captain Markham has recorded the feelings of all Englishmen as to their conduct: "The work of these two young officers on this occasion stands out conspicuously amongst the many deeds of devotion with which the annals of Arctic adventure abound."

Rawson and Egerton started again on their perilous errand on March 20th, and, after many adventures and much hardship, succeeded in reaching the *Discovery* on the 24th. Rawson was incessantly employed on sledging work for the remainder of the season. Returning to the *Alert* on the 4th of April, he pioneered a route across Robeson Channel to the Greenland coast from the 10th to the 18th, and again crossed to Greenland with Lieutenant Beaumont. Rawson accompanied that distinguished Arctic traveller along the northern coast of Greenland until May 10th, when the two explorers ascended a hill, afterwards named Mount Wyatt, 2050 feet above the sea. The return journey was then commenced by Rawson, with a dying man on the sledge, and he reached Polaris Bay on June 3rd. From that time his services were devoted to the succour of returning explorers. On one occasion he attacked and killed a musk ox without a gun, and armed only with a stick and a knife which he fastened to the end of it; ever on the look out to procure fresh meat for the sick. On the 22nd he started on a journey for the relief of Beaumont, and he did not return to his ship until the 3rd of August. He was away sledge travelling for 132 days; and his coolness and sound judgment, indomitable perseverance, and inspiring cheerfulness showed him to possess all the highest qualities of an Arctic explorer. Yet he had only just completed his 23rd year when the expedition returned to England in November 1876.

In the following year Rawson was appointed to the *Alexandra*, bearing the flag

of Admiral Hornby in the Mediterranean, and he continued to serve on that station and in the Sea of Marmora until 1880. He was attacked with rheumatic fever, and was for some time at Haslar Hospital. But he recovered, and before he again went to sea, he was happily married to Maud, the eldest daughter of the late John Hegan, Esq., of Queen's Gate, Kensington, a young lady to whom he had been attached for several years. On December 7th, 1880, he joined the *Champion* corvette as first lieutenant, and went in her to the Pacific station; but in the next year his good services procured for him a position which made future advancement certain. He was appointed to the Royal Yacht on October 31st, 1881; and for a few happy months he was able to live quietly with his young wife at Southsea. A child had been born to him in his absence, and he received the joyful news while he was in the Pacific.

When the campaign in Egypt was decided upon, it was desirable that Sir Garnet Wolseley should have a naval aide-de-camp on his staff. The General applied for the services of young Rawson, whom he had known in Ashanti, and the Queen graciously acceded to Sir Garnet's request. On the 12th of September Sir Garnet and his staff made a careful reconnaissance of the lines at Tel-el-Kebir, and took bearings; and the members of the staff were told off to guide the different brigades in the right direction, during the night march. Wyatt Rawson pioneered the Highland Brigade, keeping some yards in advance until he reached the foot of the rampart. He had gallantly scaled and had crossed the first line of entrenchments, when he fell with a rifle bullet through his body.

Sir Garnet Wolseley, in all the hurry and urgent business after the victory, found time to ride back two miles to see his young friend for the last time, who was lying in a tent, waiting to be taken down to Ismailia. The General knelt down by poor Rawson's side, and said, "I know you were well to the front, old fellow, all the time." He was much affected, and when he left he said he would telegraph to his wife. It was generally admitted by officers in the action that it was due to Rawson's admirable guidance that there were not more casualties. For he brought the Highland Brigade exactly to the right spot at the proper moment, namely, just at dawn. A mistake causing even ten minutes' delay would have exposed the men to a heavy fire while charging the entrenchments. He guided them through the dark night entirely by his knowledge of the bearings of the stars.

From the first there could be no hope. He was conveyed on board the steamer *Carthage*, but died a little before ten o'clock on the morning of the 21st of September, as she was entering Malta harbour. A public funeral was awarded him at Malta, his coffin being followed to the shore by thirty men-of-war's boats, and the service was attended by the chief authorities of Malta. He was buried in the Bighi cemetery. He was conscious to the last. This bright young spirit was called away when on the full tide of success. In his short life he had already done much useful work, and he had done it heartily, thoroughly, and modestly. It was completed and its conclusion was most glorious. But young Rawson will leave a sad blank, and many friends will mourn over his early death. Among those who thus mourn is our gracious Queen, who did not allow a day to pass without writing to Mrs. Rawson, and expressing her deep sympathy and sorrow, and the hope that the thought of her dear husband's gallantry would be a source of comfort to his widow. Sir Garnet Wolseley telegraphed the news in the following words:—"I deeply regret that Rawson, while gallantly piloting the Highland Brigade into action this morning, was shot through the body, and is now in a critical state. His gallantry was most conspicuous." The Admiralty also expressed sympathy and regret, and they showed their sense of Rawson's services by promoting him to the rank of commander, with the following most complimentary notice in the Gazette: "The following promotion has been specially made in Her Majesty's fleet for valuable and gallant services rendered at

the battle of Tel-el-Kebir on the 13th instant, on the recommendation of the General officer commanding Her Majesty's forces in Egypt, to take effect from that date. Lieutenant Wyatt Rawson to be Commander."

To our Society the death of this experienced though youthful Arctic explorer will also be a loss, for he was an ardent geographer, and much good work would surely have been done by him, if his life had been spared.

John Petherick.—Mr. John Petherick, one of the pioneers of travel in the White Nile region, died in London on the 15th of July. He was, for some years prior to the great expedition of Speke and Grant, engaged as a trader in the Egyptian Soudan, and in the course of his operations penetrated to the south, in the regions west of the White Nile, further than had been reached by any previous traveller. An account of his explorations was published by him in 1861, under the title of 'Egypt, the Soudan, and Central Africa, with explorations from Khartoum on the White Nile to the Regions of the Equator.' Being then (November 1860) in England, making preparations to return to Central Africa, having been appointed British Consul in the Soudan, the Council of the Royal Geographical Society availed themselves of an offer made by him to meet Captains Speke and Grant at Gondokoro, at the time (February 1862) they were expected to arrive at that trading station on emerging from the region of the Victoria Nyanza and the Nile sources, and to place boats, provisions, and men at their service for their further journey down the Nile; provided the pecuniary means for the purpose were furnished by the Society. About 1000*l.* were raised, chiefly by the subscriptions of Fellows, the Society and Her Majesty's Government heading the list with 100*l.* each, and for this sum Mr. Petherick undertook to place two boats with provisions, under the superintendence of one of his own men, to await the expedition at the place named, from November 1861; the agreement between him and the Society requiring him to proceed south to meet Captain Speke if he did not arrive at that date, but not binding him to remain beyond June 1862. Speke and Grant, as is well known, did not reach Gondokoro until a year after the time calculated, namely, in February 1862, and Petherick, who, with his heroic wife, had made a long detour west of the White Nile and met with endless obstacles and disappointment, was not there to meet them. The promised boats and provisions were there, but Captain Speke being dissatisfied with Petherick's proceedings, preferred to accept the proffered help of Sir Samuel Baker, who had also in the meantime arrived at Gondokoro, and Petherick returned down the Nile. The result was disastrous to Petherick. Soon after Captain Speke's arrival in England, Petherick was deprived of the Consulship at Khartum, and some difficulties arising at the same time with native officials, his mercantile affairs fell into disorder, threatening him with ruin, which was only averted by the Egyptian Government making him some compensation for his losses. His later years were spent in retirement in the West of England.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Kœchlin-Schwartz, A.—Un Touriste en Laponie. Paris (Hachette): 1882, cr. 8vo., pp. 526, maps. (*Williams & Norgate*: price 3*s.*)

Contains a tolerably long chapter on the Lofoten isles; the maps (besides a general one showing author's routes) are of Finmark, scale 1:965,000, and of the country between Bodø and Piteå, scale 1:705,000, from the Swedish and Norwegian State Surveys.

Schwartz, [Dr.] Bernhard.—Montenegro, Schilderung einer Reise durch das Innere, nebst Entwurf einer Geographie des Landes. Leipzig (Frohberg): 1883 [1882], 8vo., pp. 472, map, illustrations [no Index]. (*Williams & Norgate*: price 12s.)

The first part contains a descriptive account of the author's journey into the interior of the Cernagora, from Cattaro by Cetinje, Antivari, Duleigno, Skutari, and Podgoriza to Nikschitsch, returning to Cetinje and Cattaro by the valleys of the Tuschina and Tara, the Moratscha and Rjeka. The second part is purely geographical, discussing the literature (chiefly diaries of Heinrich Barth, which are reproduced), horizontal and vertical formation, with table of heights, geological and mineralogical aspects, including an analysis of a newly discovered petroleum spring, climate, hydrography, flora, fauna, and population.

The map (1:600,000) shows the new and ancient boundaries, with ecclesiastical edifices, fortifications, roads, &c.

Thoroddsen, Thorvaldr.—Oversigt over de islandske Vulkaners Historie. Kjöbenhavn (Bianco Lunos Kgl. Hof-Bogtrykkeri): 1882, 8vo., pp. 170, maps.

After an introductory general account of volcanic eruptions and earthquakes which have taken place in Iceland during historical times, the author discusses the situation of volcanoes now in activity, which he divides into 8 groups, (1) of Snæfellsnes, (2) of Hecla, (3) of Reykjanes, (4) of Katla, (5) of Varmárdalur, (6) of those south of the Vatnajökull, (7) of Odathahraun, and (8) of Myvatn, which he describes in detail. He then gives a chronological list of eruptions and earthquakes from about A.D. 900 to 1879, in many instances with particulars of prominent circumstances, and shows that eruptions have only taken place at about 20 different points, the volcanoes being generally small, and giving vent to only one eruption. Of the large volcanoes, Hecla has had 18, Katla 12 or 13, Eldeyjar near Reykjanes 10, and Trolladyngja 6. The greatest lava current was in 1783, and the most active periods have been in the 14th and 18th centuries. The ice-covered volcanoes in the south have never emitted lava, but only cinders, though there is a special danger from the projection of their glacial covering. The eruptions have in each period been concentrated, rarely occurring in succession at great intervals of space; and earthquakes have a close connection with them.

A copious bibliography of the subject (pp. 135-148) is divided under MSS., and separate books and papers in Transactions, &c., and a summary in French concludes the work.

The maps represent the Hecla group, and Iceland generally (constructed by Professor Johnstrup) showing the volcanoes and lava streams.

AFRICA.

Capello, Hermenegildo de Brito, and Ivens, Roberto.—From Benguella to the Territory of Yacca. Description of a Journey into Central and West Africa. Comprising narratives, adventures, and important surveys of the sources of the Rivers Cunene, Cubango, Luando, Cuanza, and Cuango, and of great part of the course of the two latter; together with the discovery of the Rivers Hamba, Canali, Sussa, and Cugho, and a detailed account of the Territories of Quiteca N'bungo, Sosso, Futa, and Yacca, by H. Capello and R. Ivens, officers of the Royal Portuguese Navy. Expedition organised in the years 1877-1880. Translated by Alfred Elwes, F.R.S. London (Sampson Low, Marston, Searle, and Rivington): 1882, 2 vols., 8vo., pp. lii. & 395, xv. & 350, maps, portraits, and illustrations. Price 42s.

The Portuguese original of this important work was noticed in the April number of our 'Proceedings' for the current year, pp. 246 & 247, in which an outline of the journeys described in it is given.

The authors in their prefatal remarks justify themselves somewhat unnecessarily for obeying their instructions and confining their explorations to the basins of the Quango and Quanza and the numerous important smaller rivers

which water the Portuguese West African possessions, instead of wandering across the continent with no definite purpose; and they disprove the statements of desertion made in Major Serpa Pinto's book by documentary evidence, showing that the parting of the explorers was by mutual consent and arrangement. The introduction also contains some particulars as to prices and expenses of carriage not usually given in works on African travel, and likely to assist others in the organisation of caravans.

The narrative commences with a description of Benguela and life in it, followed by first experiences of the difficulties of African travel during the ascent from the coast to Killengues, found to be in $14^{\circ} 3' 10''$ S. lat., and $14^{\circ} 5' 3''$ E. long. (a difference of 37 miles from its hitherto supposed position), where the travellers stayed for the last fortnight of December 1877. Thence, after crossing the great Visséua chain, the upper basin of the Cunene was traversed to Caconda, the abode of José de Anchieta, the Portuguese naturalist, shortly after leaving which the members of the expedition parted for a time. Serpa Pinto taking a more northern road to the Bihé country, where the final separation took place. A good description of Bihé, the chief point of departure of the caravans bound for the interior, is given: it is extremely fertile and probably one of the richest tracts in the interior. The natives, who are more correctly termed Binbundo (sometimes wrongly "Quinbundo") are also specially discussed. From Belmonte, the residence of Silva Porto, an excursion to the south-east was made past Cangombe, in the hope of reaching the head of the Quanza (said to rise in a vast lake called Mussombo, having an island in its centre, covered with vegetation), but at S. lat. $13^{\circ} 3' 57''$, E. long. $17^{\circ} 17' 19''$, the travellers were compelled to return, the river source being still 35 miles off, in a south-west direction. Continuing north-east across the plateau of Bihé, the Quanza was crossed into Luimbe at N'jamba, being here 55 to 65 yards wide and 13 to 16 feet deep; and after ascending the opposite heights of Bandua, a tramp of 35 miles E.N.E. was required before reaching the Luanda. This important river, according to native information, rises at no great distance from the territory which gives birth to the Quango and Cassai, and runs for some 160 miles till it reaches the Quanza (at $10^{\circ} 30'$ S. lat.): below Mongia it has a mean breadth of from 32 to 43 yards, and 20 miles above that point is impeded by a deep fall, another fall blocking its course 100 miles below. It is very abundantly supplied with fish. Foiled at the mouth of its Cassique affluent in their attempt to reach the head-waters, the authors turned in a more northerly direction through Kioko (more properly "Tchiboco") to Cangombe, not to be confused with the place of the same name in Bihé, south of Belmonte. Here they met the most important ruler of this part of the continent, Muene (or king) N'dumba Tembo (the latter word also meaning "prince," though in the lake regions it apparently means "elephant"). This chief, who possessed features indicative of intelligence and dignity, with a certain refinement of manner, received them well; and while staying in his splendid country, Ivens visited the sources of the Quango, by invitation of the neighbouring chief Kibau. These were fixed at $11^{\circ} 27'$ S. lat., and $19^{\circ} 11'$ E. long., altitude 4756 feet; and from the point of observation not only the upper Quango, but the Caíeu source of the Cassai, the sources of the Tchipeça, and an infinity of affluents of the great east and west African water-systems were visible. The kingdom of Kioko is in fact a hydrographic centre, and is termed by the authors the "Mother of African Waters"; standing on a granitic plateau, with a mean altitude of 1530 feet, the intense heat of the tropics is there tempered by breezes which render the climate salubrious to the European. Much iron and copper exists in it, and the valuable economic vegetable products are considerable; the natives are good agriculturists and blacksmiths, and show great respect to their chiefs. Five or six "varieties" of rhinoceros were distinguished by the native hunters (p. 222), two of which are quite irreconcilable.

After some stay in this country, the travellers decided on following the Quango northwards, dividing their expedition into two parts, one taking the west and the other the east bank of the river, intending to meet again at Cassange. The western party, under Ivens, followed the deep and broken

valley which lies between the precipitous heights of Tala Mogongo on the west and Maenga on the east, through broad forests, and across a very large number of the western affluents of the Quango, the first halt being at an elevation of 4593 feet, on the watershed of that river and the Quanza, after passing which they were in the very heart of the great honey and wax producing region, the bees in which were a serious impediment to travel. Continuing to follow the tortuous course of the great river by its left bank (which is persistently called the right bank in the narrative), after crossing its Luali feeder, a native battue of antelopes on a large scale was witnessed at Cha Calumbo, a graphic description of it being given at p. 244. Near this point is a slight fall, and the difference between the low and full stream was estimated at seven feet. A Kioko native was here met, who supplied some astonishing details (p. 247) of cannibals met with during his travels down the Cassai. A succession of deep fissures in the eastern spurs of the great Maenga chain, forming the beds of further affluents, had to be traversed, rendering progress excessively slow and painful, a welcome rest being made at Catunga, a handsome village. Thence descending the steep slope of Tala Mogongo, Ivens at last, from a height of 1500 feet, was gratified by the sight of the entire hydrography of the Quango westwards in Minungo, and northwards in Cassange, and then visited its Caparanga falls, renamed Louisa, which have a sudden drop of 163 feet. A little north of these falls the party was lost in the forest, and only found a way by setting fire to it, causing a vast conflagration, on emerging from which they found themselves away from the river, and finally reached Cassange by a direct north-western route through Kembo. While waiting here for his companion, Ivens made short journeys to the Kitumba Cakipungo, Calandula, and Cambolo.

The eastern caravan, under Capello, crossed the upper Quango on Aug. 13th, and then travelled northward at some distance from the main stream, which was reached and recrossed at nearly the same place as that where Ivens had turned north-west to Cassange. About half-way before arriving at this point, Capello left the path and struck north-east from the village of N'Dumba Tchiquilla to Muene Caengue on the road to Kimbundo, for the purpose of getting supplies; but on his return was compelled by want of carriers to wait until joined by a party sent back from Cassange by Ivens, according to arrangement. It may be here noted that the map shows a journey from Muene Caengue in a north-westerly direction to the Quango crossing, of which the text supplies no particulars, and the route mark is probably owing to an engraver's error. Cassange was reached and the two parties were reunited on Oct. 18th.

An interesting account of the three districts (Kembo, Yongo, and Holo) of this territory, of which Cassange is the chief town and commercial emporium, and of the Ban-gala who inhabit it, and their "Jagga" rulers, &c., is given by the travellers, before recommencing their narrative. On December 19th they re-started in a north-easterly direction, intending to cross the Quango and descend it; but on reaching it at Banza e Lunda were obliged to turn back by native opposition in force. The river here is from 55 to 65 yards across, not navigable during the rains, and with falls and rapids, of which the worst are at N'zamba and Tuaza, 15 miles north. A second stay in Cassange gave the opportunity for further descriptions of the people and their customs, extended to the country of the Lundas, with a brief history of the Muata-Yanvo dynasty.

In the middle of February, 1879 (the hottest time of the year in these latitudes) the two travellers left Cassange, striking west over the Lui, and then endeavouring, without success, to reach the Quango in a northerly direction through Holo. Resuming the western route round the upper spurs of Tala Mogongo, the rise and proper course of the Cambo affluent of the Quango was determined, some former errors as to its supposed direction N.N.E. through Yongo and Holo being corrected. Near Malange, Dr. Max Buchner was met, on his road to Lunda, and after ten days' further travel, the great Lianzundo cataract of the Lucalla, 97 feet deep, was sighted, and the Portuguese fort of Duque de Bragança reached the next day. After twenty-four days' rest, having been just 532 days away from Benguela, a fresh start was made northwards

through the Jinga country; and after discovering the source of the Hambo, a large affluent of the Cambo, the road lay across rocky broken country into Hungo territory, of which the people differ much in type from those further south, and own allegiance to the King of Congo at St. Salvador. A lake called Tiber (? Tibre of the map) was visited here, and the expedition continuing north and north-east, crossed the Cugho affluent of the Congo and the Fortuna (wrongly Fantuna on map), through forest and desert country, with food running short and suffering many hardships, and finally reaching the left bank of the Quango at Chacala. Here the new tribe Ma-yacca were first met, and an account is given of them and their chief Kianvo or Muene Puto Cassongo, whose residence is four hours' journey from the right bank of the river, under $6^{\circ} 30' S.$, at which latitude the travellers, worn out by illness and the heat, were compelled to turn back. The country here is described as deserted and very rugged, with lakes but no rivers. These lakes are not the remains of any larger body of water, but consist of small basins, confined by lofty walls. The old lake Aquilonda is considered to be non-existent. On leaving the Quango the travellers sum up (vol. ii. p. 140) their observations on it, giving positions of twelve obstructions known to them, and concluding that it is less capable of being turned to account than is generally supposed. The return to Duque de Bragança was made by a south and south-westerly route, recrossing the Cugho and following the eastern side of the Cauali basin in Matamba, the sources of that river being crossed in a region of considerable hydrographic interest, as it contains also the head-waters of the Sussa, the Luando, and the Luculla.

Having lost many of their goods and some of their registers, &c., by fire, the travellers left Duque de Bragança and struck south-west to Ambaca, thence visiting Pungo n'dongo, and after an excursion to the Lombe and the cataracts of the Quanza, arrived at Dondo (near which they met Von Mechow on his road to Malange), and finally at Loanda on October 13th, 1879, having spent 729 days on the road.

The appendices and tables have already been noticed in the remarks on the Portuguese edition, but the conclusion of the work (vol. ii. pp. 231-276) may be here mentioned as containing an epitome of the more important results of the authors' surveys and experience. The general result of this is to urge the richness of the products, the fitness of the table-land for European constitutions, and the necessity of railroads as aids to the natural waterways.

The map (scale 1:1,940,000) has been divided into two sheets and re-engraved, the original being on a rather larger scale (1:1,481,000) but not so clearly executed. The scientific nomenclature throughout the work is apparently much in need of revision.

[Egypt.] **Report on Egypt.**—Compiled in the Intelligence Branch, Quarter-master-General's Department, Horse Guards, War Office. London (Harrison & Sons, for H.M. Stationery Office): 1882, 8vo., pp. xiv. and 470, map and sections.

The Egyptian campaign being concluded, there is no indiscretion in referring to the mass of useful information incorporated from reliable sources in this military work. The geographical portion of it, in addition to general description, contains topographical and geological notices, with details of inhabitants (tribes, religion, customs, education, &c.), climate, &c. A small gazetteer of towns (pp. 112-141), a chapter on routes (pp. 339-463), and a list of works on the country, will be found of special use.

GENERAL.

Ruge, [Dr.] Sophus.—Geschichte des Zeitalters der Entdeckungen. Berlin (Grote): 1882, 8vo., pp. 193-336, maps, illustrations. (*Williams & Norgate*: price 3s.)

This continuation of Ruge's History of early geographical discoveries forms part 56 of Oncken's 'Allgemeine Geschichte in Einzeldarstellungen,' noticed in our 'Proceedings' for 1881, p. 638. It completes the description of

the route of the Portuguese to South-eastern Asia by an account of Nuno da Cunha and sketches of their early voyages to the Moluccas, China, and Japan, with a discussion of the phantom Gold and Silver Isles; and commences the Spanish voyages to the west and the discovery of the New World. The early life and voyages of Columbus and his companions are entered into at some length, and illustrated by reproductions of old illustrations and letterpress. Maps of the discoveries of Columbus and of the region of the Guanahani problem are given in the text; and the part is accompanied by a coloured copy of the oceanic side of the Behaim Globe of 1492, slightly reduced but showing the inscriptions clearly; also by a facsimile reproduction (one-third of the original size) of the oldest map of America, being the western part of Juan de la Cosa's parchment earth-map of 1500 in the Marine Museum at Madrid.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

EUROPE.

Austrian Government.—Specialkarte der Oesterreichisch-Ungarischen Monarchie. Scale 1:75,000 or 1 geographical mile to an inch. K.-k. militär-geografisches Institut, Wien, 1882. Price of each sheet, 1s. 4d. (*Dulau.*)

The following sheets are just published:—Zone IV., Col. 8, Kaaden und Joachimsthal. Zone VI., Col. 11, Königsaal und Beneschau. Zone X., Col. 9, Kuschwarda. Zone XV., Col. 16, Kapuvár. Zone XVI., Col. 14, Hartberg und Pinkafeld (Pinkaffö). Zone XX., Col. 13, Pragerhof und Wind. Feistritz. Zone XX., Col. 15, Warasdin und Kottori. Zone XXI., Col. 13, Rohitsch und Drachenburg. Zone XXI., Col. 16, Berzence und St. Georgen. Zone XXII., Col. 12, Rudolfswerth. Zone XXII., Col. 13, Gurkfeld, Rann und Samobor. Zone XXIII., Col. 14, Velika Gorica und Lekenik. Zone XXIII., Col. 15, Kloster Jvanic und Moslavina. Zone XXIV., Col. 15, Sisak und Sunja.

Danish General Staff.—Generalstabens topographiske Kaart over Danmark. Scale 1:40,000 or 1·8 inches to a geographical mile. Kalchographeret og graveret ved Generalstaben. Kjöbenhavn, 1882. Sheets: Stavnshoved and Silkeborg. (*Dulau.*)

Kiepert, H.—Die neue griechisch-türkische Grenze nach den Bestimmungen der Conferenz zu Constantinopel Nov. 1881. Reduction der von der internationalen Commission aufgenommenen Originalkarte in 1:50,000.

I. Westliche oder Epirotische Grenze des Königreiches Hellas. II. Nördliche oder Thessalische Grenze des Königreiches Hellas. Scale 1:200,000 or 2·7 geographical miles to an inch. Zeitsch. d. Ges. f. Erdk., Bd. xvii. Taf. III. IV. Gez. v. H. Kiepert. Berlin, Dietrich Reimer, 1882.

— Nord-Thessalische Grenzlandschaft aus der im Archiv des Ausw. Minist. zu Paris aufbewahrten Handzeichnung von G. Lejean (copirt von H. Kiepert, 1879). Gleicher Maasstab mit der Karte der neuen Grenze 1:200,000 or 2·7 geographical miles to an inch. (Hälfte des Originals.) Schreibart des Originals beibehalten. Zeitsch. d. Ges. f. Erdk., Bd. xvii. Taf. V.

— Trigonometrische Aufnahmen in Epirus-Thessalien und Compass-Recognoscirungen. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Zeitschr. d. Ges. f. Erdk., Bd. xvii. Taf. VI. Berlin, Dietrich Reimer, 1882.

A pamphlet accompanies these maps entitled:—"Die neue griechisch-türkische Grenze in Thessalien und Epirus": Von H. Kiepert. (Separat-Abdruck aus der Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1882, 3 Heft.)

Ministre de l'Intérieur.—Carte de France, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, 1882. Sheets X.—24, La Rochelle; XI.—18, Durtal; XI.—20, Doué; XI.—24, Aulnay; XII.—19, Saumur; XII.—20, Chinon; XII.—25, Mansle; XXIII.—10, Montmédy. Price of each sheet, 7*d.* (*Dulau*.)

Ziegler.—Karte d. Cantons Graubünden. Scale 1:250,000 or 3·4 geographical miles to an inch. Wurster & Co., Zurich. Price 2*s.* 6*d.* (*Dulau*.)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 30th June, 1882.

1-inch—General Maps:—

SCOTLAND: Sheet 82 (in Outline and with Contours), 1*s.* 9*d.*

IRELAND: Sheet 131 (Hill-shaded), 1*s.*

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IRELAND: Cavan (revised), sheet 16, 2*s.* 6*d.* Longford (revised), sheet 4, 2*s.*

25-inch—Parish Maps:—

ENGLAND—**Buckingham:** Clifton Reynes, sheets V.—8; VI.—5; 3*s.* each. (V.—4 and VI.—1); V.—7; 3*s.* 6*d.* each. II.—15; V.—3; 4*s.* 6*d.* each. Area Book 1*s.* Cold Brayfield, sheets III.—9, 13; 2*s.* 6*d.* each. II.—16; (V.—4 and VI.—1); 3*s.* 6*d.* each. II.—12; 4*s.* Area Book 1*s.* Gayhurst, sheets IV.—12, 16; 3*s.* each. V.—9, 13; X.—1; 3*s.* 6*d.* each. Area Book 1*s.* Newport Pagnell, sheets X.—8; 3*s.* V.—13; X.—1, 3, 4, 6, 7, 10; 3*s.* 6*d.* each. V.—14; X.—5; 4*s.* each. X.—2; 5*s.* 6*d.* Area Book 1*s.* Newton Blossomville, sheets V.—8; 3*s.* II.—16; (V.—4 and VI.—1); 3*s.* 6*d.* each. II.—15; V.—3; 4*s.* 6*d.* each. Area Book 1*s.* Olney Park Farm, sheet II.—10; 3*s.* Area Book 1*s.* **Shropshire:** Edgmond, sheets XXIII.—15; XXX.—2, 3, 10, 15; 3*s.* 6*d.* each. XXX.—4, 7, 11, 12, 14; 4*s.* each. XXX.—8; 5*s.* XXXI.—5; 5*s.* 6*d.* Ercall Magna and Do. (Det., Nos. 1, 2, 3), sheets XXII.—15, 16; 2*s.* 6*d.* each. XXIX.—3, 6, 7, 9, 11, 12, 13, 14, 15, 16; XXX.—5, 9; XXXV.—1, 2; 3*s.* 6*d.* each. XXIX.—4, 8, 10; XXX.—1, 13; XXXV.—3, 4, 7, 8; XXXVI.—1; 4*s.* each. Area Book 2*s.* 6*d.* St. Mary and Do. (Det.), sheets XXVIII.—9, 10, 13, 14; XXXIV.—2, 3; 3*s.* 6*d.* each. XXVIII.—5, 6, 15; XXXIV.—1, 5; 4*s.* each. XXXIV.—6; 4*s.* 6*d.* XXXIV.—7; 6*s.* 6*d.* XXXIV.—10, 11; 8*s.* each. Area Book 1*s.* 6*d.* **Suffolk:** Bromeswell, sheets LXVIII.—14; LXXVII.—1, 2; 2*s.* 6*d.* each. LXVIII.—13; 3*s.* 6*d.* LXVIII.—9, 10; 4*s.* each. LXVII.—16; 5*s.* 6*d.*

Town Plan—Scale 1:500.

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ENGLAND: Index to 6-inch County Map of Flintshire (scale 2 miles to 1 inch), 2*s.* 6*d.*

Publications issued from 1st to 31st July, 1882.

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SCOTLAND: Sheet 100 (in Outline and with Contours), 1s. 6d.

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Bombay Presidency: Trigonometrical Branch, Survey of India. Sheets 13 and 14 of Cutch. Parts of Cutch, Bani, and the Great Ran. Season 1880–81. Scale 1 inch to 1 mile. Trigonometrical Branch, Survey of India. Sheets 17, 33, and 34 of Guzerat. Parts of the Surat Collectorate, of the Gáikwár's Territory, and of the Rewa Kántha and Sachin States. Scale 1 inch to 1 mile. Seasons 1879–80 and 1880–81.—Trigonometrical Branch, Survey of India. Guzerat. Sheet 33. Section 1 (Seasons 1879–80 and 1880–81). Part of the Mándvi Táluka of the Surat Collectorate. Scale 2 inches to 1 mile.—Trigonometrical Branch, Survey of India. Section No. 1 of Sheet No. 50 of Guzerat (Dáng Forests). Parts of the Dáng Pimpri and Dáng Váurna States. Scale 4 inches to 1 mile. Season 1879–80.—Khandesh and Bombay Native States Topographical Survey. Sheets 6 and 37 (Parts of Khandesh). Scale 1 inch to 1 mile. Seasons 1875–81.

Madras Presidency: Mysore Topographical Survey. Scale 1 inch to 1 mile. Sheets 20 (Parts of Kadur and Shimoga Districts), 27 (Parts of Chitaldroog, Kadur, and Shimoga Districts), 28 (Parts of Chitaldroog, Hassan, Kadur, and Tumkur Districts), 29 (Parts of Hassan, Kadur, and Tumkur Districts). Seasons 1878–81.

Trans-Frontier Surveys: Great Trigonometrical Survey of India. Trans-Frontier Maps. Skeleton Sheet No. 9 (Second Edition). Trans-Frontier States, Nepal, Sikkim, Parts of Great Tibet, Parts of Bhotan. Scale 16 miles to 1 inch. 1882.—Part of Southern Afghanistan with the adjoining portion of Baluchistan. Scale 1 inch to 8 miles. 2 sheets. Seasons 1878-79-80-81.—General Map of the Kandahar District. Scale 1 inch to 4 miles. Season 1881-82.—Military Map of the City and Environs of Kandahar. Scale 4 inches to 1 mile. Season 1880-81. 2 sheets.—Route traversed by the Bozdar Field Force under the command of Brigadier-General H. C. Wilkinson, Nov. and Dec. 1881. Scale 1 inch to 4 miles.

Kiepert, H.—Lykia. Scale 1:400,000 or 5·5 geographical miles to an inch. Karia. Scale 1:400,000 or 5·5 geographical miles to an inch. H. Kiepert, Berlin, 1882.

These maps show the routes of the following travellers:—Benndorf u. Niemann, 1881. Schönborn, 1841-42; Daniell and Spratt, 1841-2; G. Hirschfeld, 1874; Kiepert, 1870 and 1842; and Wrongschenko, 1834. They are only provisory sketches made expressly for the Austrian Archaeological Expedition of 1882.

AFRICA.

Debes, E.—Karte v. Unter-Egypten. Scale 1:1,000,000 or 13·6 geographical miles to an inch, nebst Spezialkarten d. Suës-Canals 1:500,000, der Umgebungen von Kairo und Alexandrien, sowie der Häfen v. Port Said, Ismailiye u. Suës. Leipzig, Wagner & Debes. Price 1s. (*Dulau.*)

Hassenstein, B.—Spezialkarte d. Kriegeschauplatzes von Alexandria, bis Tanta. Scale 1:270,000 or 3·7 geographical miles to an inch. J. Perthes, Gotha. Price 1s. (*Dulau.*)

Intelligence Branch, War Office.—Sketch of country between Alexandria and Kafr Dauâr. Showing the Fortified Position occupied by the British Troops under Sir A. Alison, at Ramleh, on Monday, 23rd July, 1882. From rough sketch furnished by Major Ardagh, c.n., r.e., dated 22nd August, 1882. Scale 1:49,000 or 1350 yards to an inch. Lithographed at the Intelligence Branch, War Office, London, Aug. 1882.

— Sketch of the Field of Operations at Kassasin and of the Lines of Tel-el-Kebir; made and defended by the Egyptians under Arabi. Carried by direct assault by the British, 13th September, 1882, under General Sir Garnet Wolseley, G.C.B., G.C.M.G. Scale, 2 inches to 1 mile. Major Hart, 1st Battalion E. Surrey Regiment, D.A.A.G. and Q.M.G., Intelligence Branch, No. 210. Lithographed at the Intelligence Branch, War Office, October 1st, 1882.

— Sketch of formation for attack, Tel-el-Kebir. (Not drawn to scale.) Intelligence Branch, No. 208. Lithographed at the Intelligence Branch, War Office, 6th October, 1882.

— Tel-el-Kebir (The Great Tumulus). Entrenched position of Egyptian Forces, stormed at dawn of 13th September, 1882, by British under General Sir G. J. Wolseley, G.C.B., G.C.M.G. Scale, 1:31,680 or 2 inches to 1 statute mile. Major J. C. Ardagh, r.e., Intelligence Branch, No. 209. Zincographed at the Intelligence Branch, War Office, October 7th, 1882.

Kiepert, Richard.—Major von Mechow's Kuango-Reise. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Red. v. Richard Kiepert. Sitzung der Ges. f. Erdkunde zu Berlin. 7th October, 1882. (*Dulau.*)

Leake, Lieut.-Col. W. M., R.A.—Map of Lower Egypt, by the late Lieut.-Col. W. M. Leake, R.A., LL.D., F.R.S. Scale 1 : 680,000 or 9·4 geographical miles to an inch. Edward Stanford, London, 1882.

This is a new edition of a portion of Col. Leake's map of 1818; the railways and Suez Canal have been added, and the topography of the original map, although in some instances incorrect, has been adhered to, except in cases where changes have been absolutely necessary. The reason given for not bringing the corrections up to date, is that the notes inserted on this map are those which appear in the original edition, and which would be unintelligible if the map was materially altered; these notes, however, are still of geographical interest. The cultivated country is coloured green, and the desert, sand hills, and plains are tinted brown.

Petermann's 'Geographische Mittheilungen.'—Originalkarte der neuesten Reisen des Dr. Emin-Bey im Lande der Madi und Schuli 1880 und 1881. Mit Berücksichtigung der früheren Reisen desselben nach den Tagebüchern entworfen u. gezeichnet von Bruno Hassenstein. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1882, Tafel 15. Justus Perthes, Gotha, 1882. (*Dulau.*)

Ravenstein, E. G.—Philips' New Map of Egypt from the latest surveys; with separate plans of Cairo, Alexandria, Suez, Port Said, &c. By E. G. Ravenstein, F.R.G.S. Scale, 1 : 600,000 or 8·1 geographical miles to an inch. G. Philip & Son, London, 1882.

Stanford, E.—Egypt. Scale 1 : 2,200,000 or 30·4 geographical miles to an inch. Edward Stanford, London.

— Sketch Plan of Alexandria showing the fortifications. Scale 1 : 73,000 or 1 geographical mile to an inch. With an inset map of Lower Egypt. Scale 1 : 2,050,000 or 28·2 geographical miles to an inch. E. Stanford, London, 1882.

Wyld, J.—Pictorial and Strategical Map of Lower Egypt. Scale 1 : 530,000 or 7·2 miles to an inch. Containing inset plans of Alexandria (scale 900 yards to an inch), and Cairo (scale 1·7 geographical miles to an inch). J. Wyld, London. Price 2s. 6d.; in case, 4s. 6d.

This map is chiefly useful in showing the canals and the water system of the Delta of the Nile, the scales on which the canals are exhibited are, however, purposely greatly exaggerated.

— Military Staff Map of Egypt, from Ismailia to Cairo, including the whole course of the Suez Canal, extending to Cairo, Tanta, Zagazig, Heliopolis, the River Nile; showing Railways, Canals, and Military Positions. Scale 1 : 200,000 or 2·7 geographical miles to an inch. With inset map of Lower Egypt, and a plan of Ismailia. J. Wyld, London. Price 3s.; in case, 5s. 6d.

This map appears to be a reproduction of sheet 4 of the Intelligence Department map of Lower Egypt with a slight extension to the North, and it also contains inset maps of the Nile Delta, and the whole course of the Suez Canal. In the plan of Ismailia Mr. Wyld's shows an extensive quay along the shores of Timsâh, which does not appear in the map of the Intelligence Department. On the whole, this is a very useful map.

— Plan of Alexandria and neighbourhood, showing the Forts and Military Defences. Scale 620 yards to an inch. With an inset map of the Naval Stations between England and India. Price 2s.; in case, 3s. 6d.

AMERICA.

Clay, Dr. F. R.—Mapa de la isla de Cuba, arreglado a la nueva division politico-administrativa. Para ilustracion del Compendio de geografia de esta isla publicado por el mismo y D. Antonio L. Pietro. Paris, E. Denné. (*Dulau.*)

Kiepert, Enrique.—Mapa General de la América Meridional por Enrique Kiepert, Profesor de la Universidad y miembro de la Academia de Ciencias de Berlin. Scale 1 : 10,000,000 or 133·2 geographical miles to an inch. Librería de Dietrich Reimer, Berlin, año de 1882. Price 3s. (*Dulau.*)

This is a beautifully executed map, and exhibits the present state of our geographical knowledge of the South American continent. In addition to the principal map, there are 7 inset maps on an enlarged scale, of:—Parte Central de Venezuela, Parte Central de Colombia, Parte Central de la Republica del Ecuador, Parte Central de Chile, Contornos de Lima, Archipiélago de los Galápagos, Contornos de Rio de Janeiro. The new boundaries between Chili, Peru, Bolivia, and the Argentine Republic are given. The map is very clear, and not overcrowded with names.

Petroff, Ivan.—Map of Alaska and adjoining regions. Compiled by Ivan Petroff. Scale 1 : 3,500,000 or 47·6 geographical miles to an inch. Department of the Interior, Tenth Census of the United States. 1882.

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in July and August, 1882.

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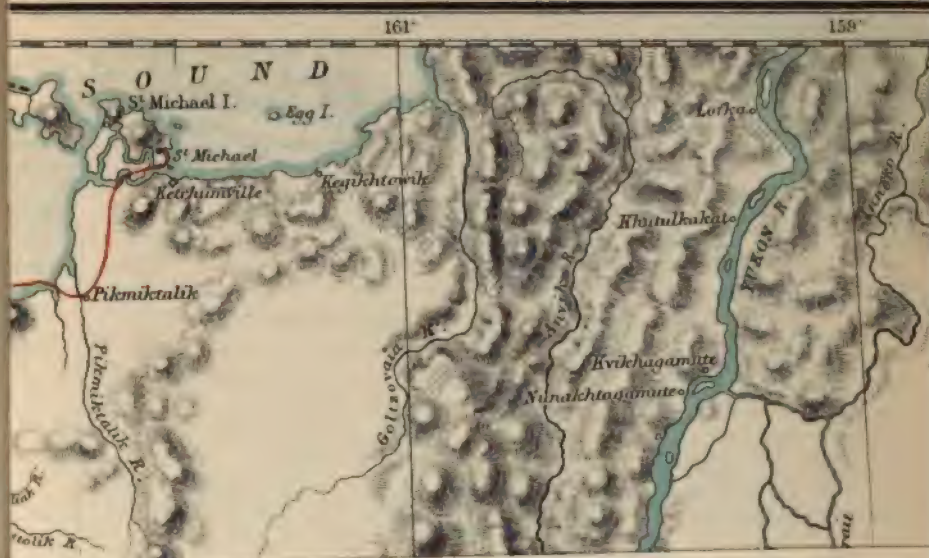
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Dépôt des Cartes et Plans de la Marine.—No. 3850. Mer de Chine, Golfe du Tonquin. De l'île du Tigre au Cap Choumay, environs de Hué, 1881.—No. 3844. Golfe du Tong-kin. Côte Nord-Ouest d'Hainan. Crique de Haw-Sui, 1881.—No. 3843. Golfe du Tong-kin. Côte Nord-Ouest d'Hainan. Croquis du Port d'Hoïta, 1881.—No. 3856. Golfe du Tonquin. Côte Nord-Ouest d'Hainan. Carte Provisoire de la Baie de Heong Po, 1881.—No. 3865. Mer de Chine, Golfe du Tonquin. De l'île Hon Tseu au Cap Lay, 1881.—No. 3866. Mer de Chine. Côtes Est de Cochinchine. De la Baie de Camraigne au Cap Varella, Baies de Binhcang et de Hone Cohe, 1881.—No. 3870. Mer de Chine, Golfe du Tonquin. Hon Tseu et Vung Chua, 1881.—No. 3855. Océan Atlantique. Bances de Terre-Neuve, 1881.—No. 3824. Tahiti. Côte Est de Faone à Pihaa, 1881.—No. 3888. Nouvelle Calédonie. Côte Nord-Est. Baie de Pam, 1881.—No. 3878. Océan Pacifique Sud. Archipel Tuamotu. Ile Fakarava, Partie du Lagon comprise entre la Passe du Nord et Rotoava, 1882.—No. 3877. Océan Pacifique. Archipel des Marquises. Ile de Ua-Pu. Baie de Vaieo, 1882.—No. 3869. Mer de Chine. Côte Est de Cochinchine. Baies de Niatrang et de Binhcang, 1881. Dépôt des Cartes et Plans de la Marine, Paris.

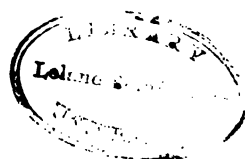
ATLASES.

Bartholomew, John, F.R.G.S.—Philips' Handy Atlas of the Counties of Wales: constructed by John Bartholomew, F.R.G.S. With Consulting Index. London, George Philip and Son, 1882. Price 2*s.* 6*d.*









PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

*Exploration through the South China Borderlands, from the Mouth of
the Si-kiang to the Banks of the Irawadi.* By A. R. COLQUHOUN.

(Read at the Evening Meeting, November 13th, 1882.)

Map, p. 776.

THE Council of the Royal Geographical Society has done me the honour to invite me to give an account of the journey which I have just accomplished across China, from Canton to Rangoon. It was with pleasure that I acceded to the request, and the pleasure has been all the greater, as I am able to count amongst those present this evening several old and valued friends, who have taken a kindly interest in my expedition from the beginning. The subject of exploration in Indo-China had been, for many years of my stay in Burma, a subject of great interest and some fascination to me. But it was really the interest aroused by a journey through the Shan country of Zimmè, aided by the wonderful narrative of the great Venetian traveller, Marco Polo, studied by me closely when I was attached to the Indian Government Mission to Siam in 1879, that decided me to attempt a somewhat ambitious journey in Indo-China. I then became aware how rich a mine lay almost untouched, not only in the matter of geography, ethnology, and general points of interest, but in a matter touching our interests vitally, viz. trade extension from British Burma. Here lay one of the few unexplored regions of the world possessing so many points of interest. The objects of my intended journey were:—(i.) To collect geographical information which would prove of value to the Royal Geographical Society and to the geographical world at large. (ii.) To amass general material for a book of travel which would be of interest to the public. (iii.) To examine Yunnan and the country south-west of it, towards our south-east Burman border, viz. the Shan States; and ascertain the possibility, or otherwise, of a trade route in this direction and the prospects of trade.

It was not till I went on leave, in 1881, that I found it possible to
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execute my project, although all arrangements had been made. Passports granted by orders from Peking, and instruments, were awaiting me at Canton, and an officer of the Chinese Consular Service, at Canton, with whom I had been in communication, would be able, I hoped, to accompany me. The Chambers of Commerce of Glasgow, Manchester, and Liverpool, all took an interest in the journey, and some members of the Glasgow Chamber voted a sum to assist me in the survey and report on a trade route between South-West China and Burma. My late companion, Mr. Charles Wahab,—who, throughout the journey and through whatever discomfort, hardship, and danger we had to encounter, was my constant companion and friend,—volunteered for the duty of assistant on the expedition, and was ready in a week.

Before leaving London, I received the most kindly assistance and advice from three men, admirably competent to do so, viz. Colonel Yule, Mr. McCarthy, and Mr. Colborne Baber. All of these gentlemen, by a happy chance, I am glad to say are here this evening. There was a fourth man, from whom I also received most kindly aid, who is not here to-night, viz. Captain Gill, whose untimely death we all had lately to deplore. The encouragement given me by Sir Arthur Phayre and Sir Charles Aitchison I shall always recollect with gratitude and pleasure.

We left London on the 6th December, reached Canton on the 20th January, and got away, after the usual difficulties, on the 5th February. Sir Thomas Wade, H.B.M. Minister at Peking, warned me, officially, of the danger of attempting to cross the China frontier to Burma. My Consular friend was, most unfortunately, not allowed to come, as his services could not be spared. I was therefore compelled to cast about for a competent interpreter and, after various unsuccessful attempts to secure the services of a suitable man, found one at last in the person of Mr. Hong Beng Kaw, B.A., a Chinese gentleman, thoroughly acquainted with English and with a good knowledge of Mandarin and some acquaintance with Cantonese. He had been employed, I believe, by H.B.M. Minister at Peking as Private Secretary and had also been in the office of the Colonial Secretary at Singapore. He was highly recommended to me by friends at Hong-Kong, and as he was most enthusiastic, he seemed just the man I required. The Consul at Canton most kindly gave me, as second interpreter, a subordinate of his Consulate, who was well acquainted with Mandarin and official etiquette and was a Cantonese. It was imperative to have interpreters knowing Cantonese and Mandarin also. After great difficulty we managed to prevail on a cook and coolie boy to accompany us as personal servants. All these men, it is needless to say, had to be very highly paid, for the Chinaman will only venture into unknown regions when heavily remunerated.

Our proposed route lay up the southern branch of the Si-kiang or Canton river, to Yunnan, then across South Yunnan to Ssümao, at the

south-west corner of China. From that place I intended to make my way through the Shan States by what I might, from information gathered on the way, consider the best route to Burma.

Before going further I would here say a few words regarding former explorations in Southern China, especially those which traversed Yunnan. The exploration of Cooper in 1868, Margary in 1875, Grosvenor and Baber in 1876, McCarthy, the missionary, and Captain Gill in 1879, and Count Szechenyi in 1880, all dealt with a totally different country, as shown on the map. Speaking roughly, their line was up the Yang-tze to its highest navigable point, thence to Tali and Bhamo. The only journeys made by Europeans in any portion of the regions we were about to traverse were:—

I. The daring journey of Macleod in 1836, from Moulmein to Kiang or Xieng Hung, close to the China frontier, on behalf of the Government of India.

II. The French expedition of 1867-68, called by the name of "The Commission of Exploration of the Mekong." This expedition, after terrible hardships and innumerable difficulties, succeeded in accomplishing the greatest exploration ever executed in Indo-China. This was the journey from Saigon, in Cochin-China, along the banks of the Mekong to Yunnan and then through that province to the Yang-tze. The journey cost France two valuable lives, viz. that of Captain Doudart de la Grée and M. De Carné. Afterwards, in the neighbouring province of Tong-king, the master-spirit of this expedition, Francis Garnier, lost his life.

III. The expedition from Tong-king up the Songka or Fleuve Rouge and through Yunnan to the Yang-tze, made by Dupuis, in 1869-70. Dupuis executed his difficult task at a time when the country was in great disorder, with remarkable skill, finesse, and courage. The results of his journey, as claimed by him, were to show that the Songka river was navigable to within the frontier of Yunnan, viz. to the town of Manhao. Whether his account be strictly accurate or not, his exploration proved that the river was navigable for a great portion of the way to Yunnan.

The journey as accomplished by us may be divided into two parts, viz. (1) The Canton river, and (2) Yunnan.

The Canton river we found might be made, with slight improvements in the channel, navigable for some 400 miles above Canton, for light draught steamers of about 4 feet, though none are allowed to ply. In the upper portion, numerous gorges and rapids of a very fierce character prevent navigation, except for shallow boats such as ours, drawing some 2 feet. The river is one of most unusual beauty, and a visit would well repay the artist or geologist. The main features of the journey through the provinces of Kwang-tung and Kwang-si, through which we passed were (i.) the insecurity of the river against robbers,

(ii.) the marked animosity of the people towards foreigners, and (iii.) the numerous fine cities fast falling into decay. The river is considered so dangerous that a cordon of so-called gunboats patrol it, but can hardly be said to afford any great security. The hatred towards the Western was shown in the hooting of the people, the cries of *Fanqui-lo* (foreign devil) and the collection of mobs wherever we landed; and, finally, in the issuing of a proclamation offering 200 taels, equivalent to about 60*l.*, for each of our heads. This, in face of the fact that we were accompanied by gunboats, which the Government had courteously ordered to escort us, speaks volumes. It was with difficulty that we got the boatmen to proceed. We had to adopt complete Chinese costume, even to the pigtail, and confine ourselves to the *Ho-tau* or "river ferry," in order to efface ourselves as much as possible, and escape attracting notice. A proof of the unfriendly attitude of the population of these provinces is, that no missionary, whether Roman Catholic priest or English, has dared as yet to attempt settling in these parts, although they are found in all the provinces northwards. Those who know the China missionaries can answer for it that they fear nothing within the limits of prudence.

The ruined cities, with the remains of once magnificent *yamens* or official residences, courts, temples, and guildhalls, prove incontestably the former affluence of these cities. Whence did this prosperity come? Not from the provinces themselves, for Kwang-si at any rate is a poor and mountainous province. It *entirely* came from the important carrying traffic from Yunnan, driven by the late Mahomedan rebellion northwards to the Yang-tzse river, and is a proof how rich the province of Yunnan must have been to support so important a river traffic. The province of Kwang-tung is much richer and more thickly peopled than Kwang-si, which is very mountainous, with the cultivable area small and the people intensely poor.

The chief crops on the Canton river are rice, ground-nuts, wheat and beans; while cassia, wood of different sorts, hemp, indigo, sugar, tea, and a small quantity of opium are articles of commerce. As I shall have to explain later on, the amount of trade possible by the Canton river will be in the future, I believe, very small. Whatever there may be will not go entirely to Canton, but be divided between that place and Pak-hoi. Salt of a coarse quality comes now from the latter port. The trade on the lower reaches of the river will go to Canton, while the trade in the upper parts, that is through Kwang-si, will, I believe, go to the new treaty port of Pak-hoi. This port offers many advantages for securing such trade as there may be in the region indicated, but this is so slight that the comparative merits of Pak-hoi and Canton as market ports are hardly worth discussing.

The people of Kwang-tung are mostly Chinese proper, known in the south as Cantonese, and speaking in the Cantonese dialect; but in

Kwang-si the aboriginal people predominate, especially away from the cities lying along the river bank, and a Cantonese cannot understand their dialect; our Cantonese interpreter could not understand the people of Nan-ning, for instance. The provincial dialects differ so much, indeed, that they may, for practical purposes, be called distinct languages. The measures of distance vary as much as the dialects, and we soon learned that the *Li* (statute measure of China) was an unpleasantly variable quantity. It varies with the character of the ground, whether up or downhill, and still worse with the state of the weather. We were constantly told later, in Yunnan, that a certain distance downhill was 30 *li*, and up, 50 or 60; while in one case we learnt that a day's march was 50 or 80, according as we started at daylight or a couple of hours later!

At the navigation limit of the Canton river, Pe-sê or Pak-shik, we left our *Ho-tau* or river boat and began arrangements for our overland march. Here we met with a most serious misfortune which went near to prevent our further progress. Our head interpreter—a highly cultivated gentleman who spoke English and German admirably and who quoted Alfred de Musset—turned out to be by no means adapted for exploration work. He complained of want of courtesy on my part; but the fact was that the nearer he came to the difficulties the less he liked them. We had never counted on his courage or his devotion, but we had thought that he would be ashamed to turn his back upon us.

The sight of the Yunnan hills, and the stories which the people we met told him of the hardships and dangers of Yunnan travel, were enough to decide him that he could not go on. The result naturally was that the second interpreter and servants refused to proceed and all were for a return to Canton. Here was a cruel position. Persuasion was useless. However, the second interpreter and servants were surprised when they found that we arranged for mules, coolies and guide all the same; and I announced that, *as they did not intend to come*, we should alter our route and go to the capital Yunnan-fu, to invite the assistance of the Roman Catholic missionaries. When they saw we were determined to go forward, they agreed to follow us *anywhere*. From that day I obtained a mastery over them, which had been wanting before. The gentleman who quoted Alfred de Musset returned—not to our exceeding depression, I confess.

The boat used by us on the Canton river is called a *Ho-tau*—literally, "river ferry." This class of boat, which is affected by the mandarins and richer class of traders, affords a very comfortable means of river travel. They are shallow-bottomed large craft, with a house divided into two or three rooms with glass windows and side doors from which you can step on to a narrow platform running the length of the boat. On this platform the boatmen pole with great skill. The usual means of progression is with a huge sail, when the wind serves. When

there is no wind, they track, by means of a long line or pole, as occasion offers.

On leaving Pe-sé, before commencing our land journey, we had to spend two days in canoes. The river had now become a hill stream, with a heavy fall, its bed being a succession of rapids. The strength of these may be guessed from the fact that the fall of the river in this two days' journey was greater than the whole fall in the river between Pe-sé and Canton. We had literally to fight our way up these rapids. Each canoe has three boatmen, but no attempt is made to pass a rapid unless a small fleet of some six to twelve boats can join together, so that the collected crews can take up boat after boat on their way up the river. We found the boatmen make great use of the temples, one of which is invariably situated at the foot of the more difficult rapids. In these so-called Buddhist temples we found divination by casting lots a common practice. The boatmen take some twenty or thirty narrow strips of wood which are enclosed in a little bamboo case. Having knelt down, they gently move this up and down until one falls out. This is given to the high priest, who, having examined the number, selects a text or inscription from a box in which numbered inscriptions are kept. This gives the answer, which bears a strong resemblance to the answers given by the Sibyl at the old Delphi oracles. They are about as intelligible; that is to say, they are concocted with a certain ingenuity which enables the reader to please himself according to his fancy. The boatmen implicitly believe in these, but we never succeeded in getting one of them to commit himself as to what was going to happen. After the event they were proud to explain how cleverly the oracle had spoken; the difficulties or absence of these with which we had surmounted the rapid were all found predicted in the text.

On the 18th of March we ascended the mountainous plateau of Yunnan and entered upon a new country and a new life. With ten mules and some eighteen porters we commenced, *en grand seigneur* as compared with later on, our march to the south-west of Yunnan. This march, some forty stages according to the muleteers, was executed with only a few days' halt, and was a somewhat trying one, though brimful of interest. We journeyed on foot, as much for the purpose of economy as for enabling us to carry on surveying operations uninterruptedly. The interpreter, however, insisted on having a sedan-chair and four porters; and I was not then in a position to refuse him. I need hardly say that, when we had well entered Yunnan, and placed several mountain ranges between us and the Canton river, he no longer travelled in that sedan-chair.

Yunnan forms an extensive uneven highland plateau in which the main ranges have a trend north and south. Between these ranges, which vary in height from twelve to seventeen thousand feet in the north to seven or eight in the south, are numerous deep defiles, through

which run some of the largest rivers of Indo-China. Amongst these the most notable are the Mekong or Cambodia, the Salween, and the Shwéli. There are lakes of considerable extent. Fertile plains and valleys are numerous. An important discovery made during my late journey was the much greater fertility of the soil and the more affluent circumstances of the population in the south than in the north of Yunnan. The only accounts that we have had of the province, with the exception of that of Lieutenant Francis Garnier, have been of journeys through the northern region, which is a poor and sterile country, where the character of the country and people is greatly inferior to that of the south. In the north the province is wild, broken, and almost uninhabitable on account of the heavy mists, fogs, and rains. In this tangle of mountains there are few valleys to arrest the eye. The population is wretchedly poor and sparse, living chiefly on maize, for the country is too mountainous for the production of rice. Maize is the ordinary food, rice an article of luxury. A few other cereals are cultivated in small quantities. Tea and tobacco of the poorest quality are found here and there. There is no commerce or industry.

The south and south-west are altogether different. The mountain ranges, which in the north-west rise above the snow-line, towards the southern borders subside greatly, and give place to undulating tracts and plains which increase in their extent and level character towards the Gulf of Siam. The country at first presents to the untrained eye the appearance of a confused sea of mountains, amongst which it is hard to detect any general trend of the ranges, or the existence of table-lands. But a more intimate acquaintance shows that the leading or main ranges have one fixed bearing, namely, north and south. In marching from east to west, mountain ranges are crossed, but between these lie large plains and valleys parallel to the main ranges, and contiguous to these smaller valleys and plateaux. The climate of the south is very different from that of the north. The season of the rains lasts from three to four months—from the end of May to the middle of September—but the monsoon is not heavy. In the dry season a steady breeze prevails, except in the lowest valleys. The temperature may be characterised as agreeable and healthy. The plains are rich, and, as a rule, thickly populated. The number of towns and villages is remarkable. They are found close together, and occupy the best position in the plains and valleys. The population is markedly different from that of the north. Except in the cities the mass of the people is made up of a number of aboriginal tribes, such as the Lolo, Pai, and Miao, &c., who have a distinct character and physiognomy. But even in the cities the Chinese type has been affected by these aboriginal tribes. Amongst them we found a kind-hearted hospitality and frankness of character. They are poorer than the Chinese, and both men and women cultivate the soil and rear cattle. The women do not crush their feet as the Chinese do;

they are blithe and gay—an agreeable contrast to their Chinese sisters. They wear a variety of picturesque costumes, which constantly change as you pass from township to township.

Notwithstanding the richness of the country, there is hardly any trade. This is partly due to the late Mahommedan rebellion and the plague which followed it. But these are not the only causes, I believe. The true reason lies in the want of communications. Not only is there an absence of any trade approach from without, but intercommunication within the province, between town and town, is rendered practically impossible by the absence of good roads, which makes carriage by mule or pony so expensive.

In the plains the products are rice, maize, peas, beans, opium, tobacco, and sugar. Most of the European fruits—such as apples, pears, plums, peaches, chestnuts, &c.—are found; while, on the hillsides, roses, rhododendrons, and camelias of several varieties, are seen growing freely. Quite one-third of the cultivated area is devoted to poppy, which is partly used locally by the Chinese valley dwellers, but mostly exported to the neighbouring provinces. The aboriginal tribes cultivate opium for sale, but do not use it. Occasionally two opium crops are grown in the year, but usually a pea crop succeeds the opium in May. The Yunnan opium finds a ready sale in other provinces on account of its superior quality. As regards the use of opium, I am of opinion that it has a most injurious and evil effect upon the Chinese, especially on those living in the highlands, where they seem to consume more than in the plains. The aborigines, who drink a rice spirit, but who avoid opium, present a great contrast to the Chinese in respect of appearance and activity. But much as I deplore the widespread practice of opium-smoking, I do not see how it is to be stopped. The Government issues edicts prohibiting the cultivation and importation of the drug, but is powerless, I believe, to deal with the question so as to effect any reform. Within the walled prefectural cities, and indeed under the very walls of the *yamen* or official court, we often found the poppy growing. In view of this, it is impossible not to believe that the stoppage of the introduction of Indian opium into China would mean no diminution in the consumption of the drug. It would simply mean an increased area laid under cultivation in China itself.

The ill-effects of opium were chiefly made apparent to us through our close intercourse with the people on the march, in the inn or in some peasant's house. But we not unseldom met mandarins being carried in their sedan-chairs under the influence of the drug, lying sunk in a heavy sleep while they were conveyed over some precipitous road. A significant fact was that nearly all the mandarins we met and with whom we exchanged presents, made their first inquiry as to whether we had any European medicine for the cure of the evil habit of opium smoking.

The population of Yunnan—a difficult matter to arrive at—is probably not less than four millions, having sunk to that figure from fifteen millions through the devastations of the civil war and the plague. The province is now, however, with order fully restored, slowly recovering itself.

The principal imports—indeed, at present almost the only import—is cotton from the Shan States, either by way of Ssümao in the south or Bhamo in the west. The cotton is imported on pack animals and carried to different parts of the province, where it is worked up into cotton stuffs.

A certain amount of British piece goods, salt, and European odds and ends, such as pins, needles, small looking-glasses and matches—British and Swedish—are imported by these routes, but more still from Canton. The principal exports are opium, orpiment, iron and copper made into cooking-pans, chestnuts, &c.

There can be no doubt as to the mineral wealth of the province. On our way through the south and west we met with a considerable number of caravans conveying coal, iron and copper in ingots, as well as silver in small quantities. At Tali we saw large quantities of gold being prepared for the Burma market by being rolled out into leaf. No encouragement is given to the development of mines by the authorities, without whose express permission they cannot be opened. The fact is that the Chinese mandarin has no love for mining operations on account of the unruly nature of the population that gathers about the mines. Miners are everywhere found to be a difficult class to deal with, and the Chinese officials find themselves powerless to control them. Gold, copper, salt, iron, silver and lead ore mines were passed by us on our way through the south and west, while coal, copper, lead, zinc, tin, iron, and silver are to be found in several places throughout the province. Many of the mines are closed, but Garnier's accounts of these, as given in his great work, are reliable. Nothing excites more suspicion than a desire to inspect and examine these mines. As a cursory visit could lead to no trustworthy information, we considered it wiser to disclaim any interest in the subject. For trustworthy information it would be necessary that a mining expert should make a considerable stay at the works, and give us a detailed report.

An interesting fact elicited by us was that the most celebrated tea in China comes from a part of the Shan country, from a district called I-Bang mainly, situated some five days south of the Yunnan frontier. This tea, which by a misnomer is called Puerh tea, from the name of a prefecture close by, is sent to the town of Ssümao for distribution. From that place it is forwarded to Peking and the northern provinces; by caravan to the Yang-tzse, thence by river to Shanghai, and from that port northwards. The enormous cost of carriage may be gathered from the fact that this tea—which is drunk throughout the

south by all the peasantry—is so costly when delivered at Shanghai that it cannot be exported to Europe or Russia. I have no hesitation in saying that before many years are over this tea will be shipped from Rangoon to China and elsewhere. A proof of the comfortable condition of the Yunnanese in the south and south-west is that the peasantry drink tea everywhere, whereas in the neighbouring provinces of Kwang-si and Kwang-tung they drink mainly hot water.

When we were in the south of Yunnan we heard a good deal about the movements of the French in Tong-king, and a high official—the Tao-Tai of Yunnan-fu, the capital—passed us on his way to inquire what was going on. When we asked what this official was going to do, we were told that he was about to inquire into the action of some unruly tribes; these tribes, it is needless to say, were the French. I am precluded from touching upon political subjects here by the rules of this Society; but some information regarding Tong-king will be of interest, I believe.

When we were at Men-tzü, which lies one-and-a-half or two days' journey north of Manhao, we found the plateau level to be 3882 feet by boiling point. A range of hills, seemingly some 2500 to 3000 feet higher, intervened between the Songka and Manhao. Taking the height at that place to be 250 feet above sea-level—a fair allowance to allow for the probable rise from the mouth—an ascent of at least 6132 feet would have to be made, and a descent of 2500 feet before the Men-tzü plain can be reached. The inhabitants of Yunnan have a great dread of Manhao and the valley of the Songka, as being deadly, owing to the miasma. According to the accounts we had, the Yunnanese always returned to the top of the plateau the same day on which they descend, which they seldom do. It was my desire to visit the Songka and follow its course up from Manhao to Yüen-kiang. When at Men-tzü I made every effort to secure guides for the purpose, but, although we offered a large sum, we could induce no one to go. The reason given was the unhealthiness and absence of any roads. The accounts given us of the river between Manhao and Yüen-kiang were that it ran between steep and precipitous bluffs, and that the torrents and rapids were fierce and numerous. This is borne out by the height of the river at our point of crossing, at Yüen-kiang, where the boiling-point showed 1033 feet above sea-level. This would give a fall of 783 feet in the short distance between Yüen-kiang and Manhao.

Thus, from the foregoing, it will be seen that the only way to approach the town of Yunnan—according to Dupuis, the goal they seek to reach—must be by ascending on to the plateau, by crossing the range of hills previously indicated, and encountering the other by no means despicable difficulties on the way to the capital. But Yunnan-fu, though the capital, is by no means in the richest part of the province. In connection with Tong-king I would point out the inaccuracy of the

western boundary as shown on many maps. Instead of extending to the Cambodia river, as it is often shown, the frontier lies, at its westernmost limit, near longitude $102\frac{1}{2}^{\circ}$. No part of Tong-king extends west of the crest of the main Anam range. The intervening country between that range and the Mékong forms part of the Independent Shan States. It is in this very region, at I-Bang and close by, that the celebrated Puerh tea, described before, is grown. The position of the Tong-king-Shan boundary is one that should be kept well in mind.

The suitability for navigation of the river below Manhao is alluded to later on, where the question of trade-routes is briefly discussed.

The prefectural cities are rectangular and walled after the manner of Chinese cities, but the walls would be useless against European arms. Each of these cities had a *Chen-tai* or brigadier-general, who was supposed to keep a thousand soldiers at headquarters, and others throughout the district. These thousand men were never to be seen, and our inquiries about them were received with a smile. We were informed, however, that the pay of the troops was drawn with the greatest regularity. On our march through the south of Yunnan to Ssümao we found the officials inundating us with attentions. We were met outside the walls, and had receptions and other entertainments, and underwent all the wearisome *convenances* of Chinese official society. As we were not what are called in China *Ta-jen*, "great men," and certainly did not look the part in our torn flannel shirts and broken shoes, these honours almost made us blush for ourselves. At Ssümao, however, these attentions ceased, and the mandarin there was particularly rude. On the following day, when we wanted to go forward, not a man would move, and no explanation was offered; pressure had evidently been brought to bear on the men which prevented their going on. We later learnt that the reason of the men refusing to go forward was that they had been told that, if they did, they would *probably die*! As soon as it became clear that it was impossible to go forward, and that this important part of the journey must be abandoned, there was nothing for it but to turn northwards and try to get into Burma by some other route. We therefore decided on marching straight north to Tali, and there regaining the regular route travelled by Margary, Gill, and others. I need scarcely say what a keen and bitter disappointment it was not being able to get forward to Zimmè. We were within some twenty-four days' march of that place, and my heart was set upon getting there. It was one of the most bitter pangs that a man could experience in a lifetime.

Here we gained most valuable intelligence that the Shan States are now entirely independent. The Chinese mandarin who resided at Kiang-Hung was withdrawn six years ago. The Burmese residents in that and other Shan States were forced to retire within the last year or

two. Tribute was no longer paid to either China or Burma. This intelligence was fully corroborated on my arrival at Mandalay.

A few words on the question of trade-routes may be introduced here while we are in the south-west of Yunnan. The subject—which is one of great importance—has been discussed more fully in a paper for the Chambers of Commerce. Later—in conjunction with my friend Mr. Holt Hallett, M.I.C.E., and a Fellow of this Society, who has assisted me in the preparation of that paper—I hope to submit to Government a complete report with detailed maps.

For the purpose of getting at the ordinary trade of Yunnan the main routes which may be considered to be available are the following:—

1. By the Yang-tze river, from Shanghai;
2. By the Canton river, from Canton;
3. By the Songka river, from the Tong-king gulf;
4. By the Bhamo route, from Bhamo on the Irawadi;
5. By some route from British Burma.

The configuration of Yunnan is such that no single route can reach or “tap” the whole trade of the province. To propose one route for the whole country is like advocating some quack medicine for a patient who lies ill with half-a-dozen ailments. The portions of Yunnan which we wish to get at are the south-west and west sides.

The most important discussion of the comparative value of the different trade-routes which has hitherto been published is that of Baron von Richthofen in 1872. In this paper the eminent traveller, whose opinions are so greatly entitled to respect, gave strong preference to the French route by the Songka river. I would, however, submit that—although the advantages claimed for the waterway, discovered by Dupuis, are mostly correct—the conclusions arrived at are in error. Richthofen was not aware of the fact that the portion of Yunnan which it is desirable to arrive at is not the south-east part and the portion lying between Manhao and the capital, but as we now know—from information gathered by us on our late journey—the south-west and west. If this once be granted as the object to be aimed at, the Songka river route no longer maintains those advantages claimed for it by Richthofen which, at first sight, do indeed seem warranted.

The comparative distances by each of the above routes, to Puerh, Tali-fu, and to King-tong—which have been selected by me as central positions of the region which we wish to reach—are given underneath.

An examination of this table, which shows the amount of river—by boat and steamer—road, and rail traffic necessary by these different routes, will prove, I feel myself justified in asserting, that the advantage lies with a railroad from the side of Burma.

TIME-TABLE IN DAYS TO KING-TONG, PUERH, AND TALI-FU, IN WESTERN YUNNAN, BY VARIOUS ROUTES.

	River.		Road.	Rail.	Total.
	Boat.	Steamer.			
<i>To King-tong.</i>					
From Shanghai (via Su-chau)	45	12	31	..	88
" Canton (via Pe-sé)	40	..	25	..	65
" Tong-king .. .. .	..	8	22	..	30
" Rangoon (via Kiang-Hung) .. .. .	..	..	14	4	18
" Do. (via Bhamo) .. .. .	..	15	24	..	39
<i>To Puerh.</i>					
From Shanghai (via Su-chau)	45	12	36	..	93
" Canton (via Pe-sé)	40	..	25	..	65
" Tong-king .. .. .	..	8	16	..	24
" Rangoon (via Kiang-Hung) .. .. .	..	..	4	4	8
" Do. (via Bhamo) .. .. .	..	15	34	..	49
<i>To Tali-fu.</i>					
From Shanghai (via Su-chau)	45	12	33	..	90
" Canton (via Pe-sé)	40	..	31	..	71
" Tong-king .. .. .	..	8	23	..	31
" Rangoon (via Kiang-Hung) .. .. .	..	..	22	4	26
" Do. (via Bhamo) .. .. .	..	15	21	..	36

The Yang-tze route, there can be no doubt, can only deal in the future—if it even does that—with the extreme north-east parts of the province. The physical features of the northern portion of the country preclude the possibility of trade penetrating southwards through that mountainous and barren region. The Canton river—on account of the extreme difficulties of navigation before arriving at Pe-sé and the mountain barriers found on the eastern frontier of Yunnan, can only be made use of to serve the extreme eastern side. This part is poor and the traffic will be consequently insignificant. The Songka river, which runs through the province of Yunnan and falls into the Tong-king gulf, will, I believe, serve the purpose of attracting the trade which lies on the south-east frontier, and also, perhaps, of a portion of the province lying between Manhao and the capital; but it will never, I believe, answer any further purpose than the above. The physical configuration of the province to the east and west make it difficult for trade to radiate in these directions. To the west I believe a route to be impracticable, on account of the considerable rivers, deep valleys, and mountain ranges which would have to be crossed. The river Songka itself—from the information which we secured—will be found to present greater difficulties than those acknowledged by Dupuis. It must be remembered that, as I have shown in my remarks on Tong-king, the river is utterly impracticable above Manhao even for canoes. From what we could learn the river is only navigable for boats of light draught to a point near the small town of Lao-kai, which is some three days' journey below Manhao. Yet M. Dupuis claims for Manhao the position of being the

future navigation-limit town of this river of Yunnan. It will thus be seen that the prospects of the Songka river route are by no means so rose-coloured as they have generally been believed to be.

Regarding the Bhamo route, the physical difficulties between Bhamo and Tali preclude all idea of this track ever serving the purpose of a general trade route to Yunnan. Mr. Baber has effectually disposed of this question in his charming and luminous report of his journey whilst attached to the Grosvenor Mission. Having travelled over the ground, I would here add my testimony to his opinion that trade from Bhamo can never penetrate east of Tali. I believe myself that the only *raison d'être* of this route is the existence of the fertile Taping valley, which serves to attract a certain amount of trade from Bhamo; and of this a very small portion drags its way on to Tali. The Bhamo route probably always will answer for the requirements of the Taping valley and the extreme western portion of Yunnan which lies in the corner west of Yung-Chang. There now only remains one other possible route, viz. one direct overland from some part of British Burma. If such a route be practicable it will, as I have already shown, tap the richest part of the province. Later on I hope to be able to show that it is by no means unlikely that an examination of the country along the routes of exploration proposed by me will show this to be feasible. It is a fortunate chance that the richest part of the province happens to lie on the side of our territory and that the approach lies through the Shan country, which I believe itself is well worth exploration and development. The independence of the Shan States must not be lost sight of. The friendliness of the people to all travellers, such as Macleod, Richardson, and Cushing, is on record. The trade, therefore, of the most valuable part of Yunnan can, I believe, be secured for our province of British Burma, if we choose to avail ourselves of the opportunity.

The Chinese tried to persuade us to go back the way we had come, but we would not do so. On leaving Ssümao, we passed fine fertile valleys and magnificent cities, partly in ruins, and altogether the whole country showed signs of great former prosperity. The march up this valley of the Papien river was a charming one. A cart-road might be made with little difficulty, and at no deterrent expense. The discovery of this fertile and beautiful region—for it may fairly be termed a discovery—was some compensation for our late disappointment. The only thing that marred the journey was the illness of Mr. Wahab, who had to be carried nearly the whole way to Tali, a march of twenty-one days. He had been unwell on the latter part of the journey to Ssümao, and at that place he was completely knocked up. Any traveller who has been placed in similar circumstances can realise what a harassing position mine was. The interpreter and two servants refused to proceed unless supplied with chairs. I had so far to give way as to procure them ponies or mules, while I trudged on foot. In this way my last coin was

spent on the day we entered Tali-fu. On the western side of Yunnan, we found a strong impress of Mahommedan times. The rebellion and plague had inflicted cruel ruin in this quarter, the Mahommedan stronghold. Both the cities and villages bore marks of Mahommedan architecture; the houses were substantially built and were ornamented with taste, and in one place we found a Moulvie teaching children prayers from the Koran. Although the plague was reported to be raging, and I believe was bad, I only met one instance of it. In the valley of King-tong, on the side of the main road, I came across a man seemingly ill. On examining him I found he was dead. Turning round, imagine my feelings when I discovered the whole of my followers had made a *détour* of some 200 yards. Each man, with his sleeve to his nose, was looking at me with an air of surprised curiosity! On reaching Tali, my companion was very ill, and on entering the city we were delighted to find a missionary (Mr. Clarke) and his wife, who received us with the greatest kindness, and spent an amount of nursing on my companion which was truly wonderful. In about a week my companion had partly recovered, and we then commenced to make arrangements for our journey from Tali to Bhamo. If it had been the caravan season, it would have been comparatively easy, but at that time of the year there was no one travelling. However, Mr. Clarke assisted us very much, and got a man to agree to take us to Bhamo for a sum of money. He seemed to be a man of considerable courage, and was known for his services in the late war.

We were fortunate enough to survey the whole length of our route from Wu-chau, some 150 miles west of Canton, until we reached Tali. All this was new ground, except where we crossed Garnier's route. At Tali we closed our work, as it was then linked on to Mr. Baber's survey and thus with Burma and Shanghai. Travelling rapidly, as we did, there was no time for observations which would have had any real value. I considered it better therefore to confine the work to a rough route-survey, giving as much detail as possible of the hills, rivers, and towns passed by us. As the Jesuits have accurately fixed most of the prefectural towns, a survey of this sort would provide a large amount of useful information and be of geographical value.

In addition to the survey we took a section of the country, done with great care, which, as we crossed the south of Yunnan from east to west—that is, at almost right angles to the mountain barriers and the intervening valleys—will be of considerable value. The geology of Yunnan as broadly noticed by us, of which we have many details in our survey books, is through the south that of limestone, sandstone, conglomerate and slate constantly recurring—first one and then another. Much the same holds good for the west, up the Papien valley, while west of Tali granite prevails until you come close to Bhamo, when, on falling down from the high plateau, schists and shales predominate.

Throughout the south we encountered a great number of natural bridges, in addition to the fine stone structures erected by the Chinese mason over most of the smaller streams. The larger rivers are spanned by iron suspension bridges. The subterranean passages are generally found in limestone formations. In one place where we were told that a river which we had been following for some time came, as the natives said, "out of the mountain," we crossed by one of these bridges, a wall of rock which seemed to close the stream. We could find no signs of the river nor where it found its exit until we had gone on some further distance, when we rediscovered the stream running through a small valley in much the same volume as down below.

It seems a curious fact that during the whole of our land march we saw no traces of game except a few pheasants, a couple of deer, and literally one wild pig. We had expected to find in this respect the country very different, but we could neither see nor hear that any large game existed in Yunnan, either in the south or in the west, as far north as Tali. When we made inquiries, the mandarins and others invariably placed the site of large game in the neighbourhood of the Tong-king borders, or in the Shan country, on the banks of the Cambodia. We heard many marvellous stories regarding the former of these regions, and one mandarin—evidently in perfect good faith—assured us that he had not only seen, but had actually partaken of, an animal described by him as a *Ma-Chiong* or "bear-horse." This strange animal is reported to have had the head of a horse and the body of a bear.

The journey from Tali to Bhamo takes twenty days, which, executed during heavy rains, is no pleasure trip; it took us forty-five days. After leaving Tali eight days we passed two Roman Catholic priests. On reaching a place called Yung-Chang we found that, owing to the behaviour of our interpreter, who had made friends with the muleteer, it was unadvisable and dangerous to go on further with them. The interpreter was anxious to solicit the protection and safeguard of Li-si-tai. This mandarin, who was conspicuous in the Margary business, had opened a new road from Yung-Chang to Bhamo, which took eight days longer than the other, and I knew this was not done for nothing. These two men—the interpreter and muleteer—pressed me to decide whether I would go by the old or the new road. They did this in order that when we got to the frontier we might not be able to go forward, as the real difficulty was at the frontier, and then the interpreter and muleteer would have been able to claim payment according to the agreement. We therefore decided to go back to Tali and get rid of the interpreter. The muleteers refused to give the mules to go back, and as there were no others to be had we started by ourselves, with nothing but a stick each, all our silver in our pockets, and the clothes on our backs. My knowledge of Asiatics led me to believe that the party would soon follow us, and sure enough the same evening up they

all came. We retraced our steps to Chu-Tung, on our way to Tali, and on arriving there we came across one of the Roman Catholic priests whom we had previously met. Père Vial had already formed the intention of trying to visit Bhamo, and had received the assent of his superior. As soon as he heard of our difficulties, although the season made the journey a most difficult and trying one, he volunteered for the duties of interpreter and came with us. It is hardly necessary to say how thankful we were for this assistance. After that we had no real difficulties, except physical ones, until we got to Manwyne, the last town on the Chinese border. This was the scene of Mr. Margary's murder, and the story is well known through western Yunnan.

The story is that the murder was executed by special orders from the local government. The man who carried it out was the famous Li-si-tai, who was at one time a well-known brigand on the borders, and was bought over by the Chinese Government, as these men usually are, by promises of position and high rank. I was particularly anxious not to meet this man. We had, however, received a letter of introduction to him from one of the Roman Catholic Missionaries near Tali, and as the servants knew of the letter information of it was sure to be carried to Li-si-tai. We therefore sent our cards over to him, and almost immediately, contrary to Chinese etiquette, which requires the stranger to make the first visit, he called on us. On being asked what was the state of the road, he said that it was in very much the same condition as usual. The season made travelling unpleasant, but there was no special difficulty of any sort. I particularly asked him about the disturbances which we had heard of on the frontier, and he said that the Kachyens were always killing each other. Next morning he left early and we then learnt all about the new road and the disturbances. Luckily for us the headmen of Manwyne were on very bad terms with Li-si-tai, and they opened our eyes to the real state of affairs. It appeared that the opening of the new road had roused the Kachyens, who found that they were losing their former income derived from the caravan traffic. The Government therefore sent down Li-si-tai, as they always did send him, to settle such matters and not to return till matters were arranged. He pretended to meet the wishes of the Kachyens, and asked their three principal chiefs to pay him a visit. These men foolishly went to an entertainment to ratify the treaty and were at once arrested; two were decapitated and their heads exhibited in the Manwyne bazaar, while at the same time the old road was kept closed to traffic. This accounted for the disturbances. A vendetta was declared by the Kachyens on this route against all comers from China. As the headmen of Manwyne expressively told us, "it would have been certain death to have gone three miles up the hillside from Manwyne." After leaving this place we proceeded to Bhamo, having to make a long *détour*, where our difficulties were at an end. During the last twelve days we suffered greatly from

privation and exposure. At Bhamo we were received with the greatest kindness by Mr. Stevenson, of the China Inland Mission, who shared with us his food, his clothing, and every halfpenny which he had in his purse. We had then only to get on board one of the river steamers and go on to Rangoon, where we found ourselves amongst old friends, and were accorded a reception such as Englishmen all over the world know so well how to give.

Our journey was one so full of interest that not one tithe can be told within the limits of time allowed me this evening. The story will have to be told in my book to be entitled 'Across Chrysæ,' which I hope will be published in January next. We were most fortunate in being able to photograph and also to carry with us through heavy rains and other difficulties, the collection, the whole way from Canton to Burma. I believe that the collection—the first ever made, roughly speaking, between the China littoral and India, a wide margin—will be found to be very interesting. It embraces almost every variety of subject—mandarins, their residences and *yamens*, or courts; the city people and the aborigines, street scenes and temples, river and hill scenery, have all been secured by the aid of the camera and brought away by us. In addition to these there are many sketches by my late companion and some by myself.

In conclusion, my only regret is that my late companion, after undergoing all the difficulties and bearing up against most cruel sickness with admirable patience and courage, is not here to-night to share with me the kindly reception given me.

[The discussion on the above paper is given in report of the Evening Meetings in the present Number.]

Native Routes in East Africa from Pangani to the Masai Country and the Victoria Nyanza.

By the Ven. J. P. FARLER, Archdeacon of Magila in Usambara.

Map, p. 776.

WITHIN the last three years Pangani has regained its position as the headquarters of the Swahili trade with the Masai country, and Kavirondo on the eastern shores of Victoria Nyanza. I have therefore been enabled to collect information from Swahili traders, who have recently been to the Masai country, about the people and routes to the lake; and I have ventured to sketch a map of this unknown land from the information and descriptions I have received.

A large, heavily-laden caravan of more than a thousand persons necessarily moves very slowly, especially as, from the narrowness of the paths, it is obliged to proceed in single file. I have come to the conclusion that a mile and three-quarters per hour, varying according to

the nature of the ground, is about the rate of progression of a trading caravan; and, except to reach water, it does not make more than eight or nine miles a day, although from the peculiarly winding nature of an African path, it has actually gone over more ground. European travellers, however, might frequently make two marches in one day, as a Swahili caravan usually marches only in the morning from 6 A.M. or 7 A.M. till noon, and then encamps for the night.

All my informants spoke of the Masai as being treacherous and unprincipled, so that it is necessary as soon as the Masai country proper is reached to construct a *boma* or fence round the camp every night, and always to keep watch against a surprise. The Masai are afraid of guns, and will not, therefore, attack a well-armed party on their guard. The Wakwafi, who seem to be an agricultural branch of the Masai people, are found scattered over four degrees. Their language is apparently only a dialectical variety of the Masai language, for any one speaking Masai can make himself understood by the Wakwafi. The Wakwafi, however, have reached a much higher stage of civilisation than their Masai brothers, for they cultivate large plantations, and at Kisongo a regular dynasty and a settled government have been established; they are also peaceable, and not treacherous.

The Pangani route seems to have the great advantage of following an easy line of country up the valley of the Luvu, with food plentiful and water everywhere.

It is well to remember that the great difficulty in getting African travellers to write the names of the places they visit in the same way is caused by an affectation of Arabic in the Zanzibar pagazi, who always change the mainland *l* into the Arabic *r*, and the mainland *v* into the Arabic *f*. Thus the native words Ushambala, Magila, Luvu, Vuga, Uzegula, Lukindo, become in the Zanzibar pronunciation:—Usambara or Usambaa, Magira, Ruvu, Fuga, Uzegura or Uzegua, Rukindo.

I will first describe the principal route, viz. that to the Victoria Nyanza, passing up the valley of the Luvu and south of Kilimanjaro; and then the shorter and less important routes. The direction of the run of the various rivers crossed on the journey is in several instances doubtful, for I found that my informants had the vaguest ideas of north, south, east, and west, and that they frequently contradicted each other as to which point of the compass they were making for, and which way a river was running. I have, therefore, marked them according to the weight of evidence, and it is possible they may be wrong.

The first halting-place from Pangani is Mawia via Ngambo. Mawia is an open village on the Luvu, where a great market is held every nine days for the produce of the Bondei country and Usambara. There are frequently between two and three thousand people present, and the day before the market numbers of Wabondeis are seen crossing the Nyika,*

* *Nyika* means a large tract of uninhabited country.

carrying rice, maize, sorghum, tobacco, semsem seeds, and honey, with goats, sheep, and fowls. Mawia is six hours from Pangani.

The next day's stage is to Maliko, a Wazegura village on a spur of Mount Tongwe, and takes six hours.

The next halting-place is Fungo, a large Bondei town under chief Fungo. It is four hours from Mawia, across a hilly country.

The fourth march is to Maliwazi, passing a mountain called Kimweri on the right; it takes four hours.

The next halting-place is Mgumi, a large town on the Luvu, six hours from Maliwazi, chief Mgumi. Cattle and sheep plentiful and cheap.

The next day's stage of five hours is to Mauri, a large village on the Luvu, under chief Baka.

The following day Tarawanda is reached, five hours from Mauri. The southern spurs of the Ukilindi hills are on the right.

The next march of six hours is to Mombo, an Usambara town under chief Lwakuru. Country wet and marshy.

The next halting-place is Mazindi, a Wakilindi town on the lower spurs of the "Vuga plateau," the residence of Semboja, son of Kimweri, the chief of all the eastern part of Usambara, five hours from Mombo. Semboja's son, Kimweri, lives at Vuga; but he prefers the lowland town of Mazindi, because it is on the caravan route, and he is able to levy a tribute on all passing caravans. He usually demands powder, the number of barrels being according to the size and importance of the caravan. Lately he has commenced to levy tribute on returning caravans; this has enraged the traders, and is contrary to custom. Many caravans now go through the centre of the Bondei country, passing near Magila, and crossing the hills north of Vuga into the Luvu valley, and so escaping his exactions.

The tenth march of six hours is to Mkomazi, a Masai settlement on the river Mkomazi, rising in the Usambara hills, and running into the Luvu. These Masai do not cultivate, but they breed cattle, sheep, and goats, which they sell to passing caravans, and also exchange with the Wakilindi for grain. They live at peace with their neighbours, and seem a quiet and inoffensive people. I hope shortly to pay them a visit.

The eleventh march of five hours is to Mikochene, a stopping-place near the Pare mountains, on a river called the Mto Pare. There is no town here, but guns are fired, and the Wapare come down to barter. The Wapare are great cattle-breeders, and are consequently frequently attacked by the Masai; but, living in strong hill-forts, the Masai rarely break in upon them, and are often driven back with loss. The Masai do not like hills; they prefer the open plains.

The twelfth march of six hours is to Masimani; no town, but a well dug by the Masai for watering their cattle. Near this place there is a high, isolated hill, called Panga la Mafisi, or Cave of Hyenas, but whether

east or west I could not get information satisfactory enough to decide. This route, however, goes through a wide valley, and there are hills both on the right and left.

The next stage brings the caravan to Upua-wa-nji, or outer Upua, a small Masai camp on the river Upua-wa-nji. It takes four hours.

The following day's stage of two hours is to Upua-wa-ndani, or inner Upua, a Masai camp on a stream, an affluent of the Luvu, of the same name. It is usual for the caravan to rest here, after this very short stage, for the remainder of the day, as the next five stages are across the wilderness, uncultivated and uninhabited except for wandering Masai and their cattle.

The following day's stage brings one to Mikwajuni, a Masai camp close to the Luvu, but it is frequently deserted.*

The next day's march of six hours brings one to Nyumba-ya-mawe, or the Stone House, because there is a great square block of stone similar in shape to the flat-roofed Zanzibar stone houses; it is merely a camping-place on the Luvu.

The eighteenth march of five hours brings us to the ford across the Luvu, called "Daraja-ya-mto-mkubwa," or ford of the big river. After crossing the river, which takes some time, Arusarche or Arusha-arche is reached in two hours, north. It is a big Masai town under chief Mitaro, on an island formed by the junction of the river Maragoa-tembo from Kilimanjaro with the Luvu. The people grow beans, *mitama* or sorghum, *mubago* or cassava, and sell them to the caravans, which usually remain here a few days for trade. They are quiet and friendly. From Arusarche the route goes across a flat open country, and after a march of five hours a camp is formed on the bank of the Maragoa-tembo, at a sleeping place, where an elephant was drowned. This is the reason why the river has the word *tembo*, or elephant, attached to it. It also shows that there must be a good depth of water here.

The next day's stage of six hours brings one to Mikinduni, on the river Shambalani. This is a narrow, deep stream, only fordable in the dry season.

From Mikinduni to Darajani is a march of six hours. There is a bridge made by a felled tree across the Shambalani; hence the name of the place Darajani; "Daraja" meaning a bridge or ford, and "ni" the locative, "at the bridge." Near this bridge there is a Masai town of size, called Laiboni.

The next day's camp is reached after a march of six hours, crossing a small stream in the way. It is situated on the river Mnyfua, coming from Mount Meru visible in the north—a good-sized hill, but completely dwarfed by Kilimanjaro behind it. There are many elephants here.

* According to the map there is an intermediate station between Upua-wa-ndani and Mikavajuni.—Ed.

Kabero, the next camp, is reached after a march of six hours. There is a small village here on a streamlet from Arusha-ya-juu. It is called so because a Swahili named Kabero died here. On the distant Mount Meru the smoke can be seen rising from the hamlets of the natives, who are agriculturists of the same stock as the Chaga people. They have large plantations, and raise a good deal of grain, which they send to Chaga and sell to caravans.

The twenty-fifth march from Pangani brings one to Arusha-ya-juu, a big Wakwafi town situated at the foot of a good sized hill, four hours from Kabero. The headman is under king Mbatiani, or Mberatiani, of Kisongo. There are large plantations here, and the inhabitants grow Indian-corn, cassava, sorghum, beans, sugar-cane, sweet potatoes, and yams. They have plenty of cattle, and sheep, and goats, but wonderful to relate, no fowls!—the first place in Africa that I have heard of without that useful, but, in Africa, tasteless bird. The people are very friendly, and the caravans usually stop a day to buy grain and food.

Four hours from Arusha-ya-juu, Mto-wa-kuchimba is reached, a big town under Mako, on a small river, dry in the hot season. The people obtain water by digging in its bed.

The next day's march of four hours and a half brings us to Kisongo, the capital of the country, and the residence of the king Mbatiani. It is a big town on the river Kumbaluni, from Mount Sebugu, in the north. There is no cultivation here, but the people have cattle, sheep, and goats, and get their grain from Arusha-ya-juu. The country is open and pastoral, with no trees. The people collect much wild honey, which they use as food. Mbatiani is the son of Suberti a'Mgogo, from Ugogo, in the south, on the road from Zanzibar to Ujiji. He arrived in the country many years ago, and acquired great influence by claiming magical powers; he married the local chief's daughter, and formed a strong government, which he bequeathed to his son Mbatiani. Mbatiani has now associated with himself in the government his son Senden, a young man of about twenty-five or thirty. Like his father, Mbatiani is supposed to possess great magical powers.

The next march is to Narko, two hours and a half west of Kisongo. The country is open and treeless, with good pasturage of short grass. The view from the town is extensive over a wide steppe to the distant horizon.

The next day's stage brings one to Nyanja, a big Masai town, six hours from Narko. Close to it is a swampy lake of shallow water, which covers a large area in the rainy season, but almost dries up in the hot season. From Nyanja there branches off an alternative route to the Kavirondo country, going north via Donyo Ngai.

The next march, on the more westerly route which we are describing, is to Simangoli. It is a long one, and a halt for the night is frequently made half-way, four hours from Nyanja; the next day a march of four

hours bringing the caravan to Simangoli, where there is a spring of good water. Some high mountains are visible in the south.

The next day a march of six hours west brings one to Mgolo, on a river flowing from Mount Mgolo. The following day the caravan reaches Miviruni, six hours from Mgolo, over a hilly country, a Masai town on a river flowing from a forest in the north. There is a large population, and many Masai villages in the neighbourhood. There are numerous herds of elephants in this district. The next stage is to Ngari-ya-mwerera, four hours west across a wilderness of small trees and grass, and situated on a river flowing from the north. A great forest is on the right, requiring four days to pass it, full of big game, elephants, rhinoceros, buffaloes, and antelopes.

The next march is to Semjuka, a Masai town, three hours from Ngari-ya-mwerera. Semjuka is the name of the chief of the district. There is a lake near this town on the north, and the forest lies behind it.

On the following day the camp is made at a spring in the midst of the forest, four hours from Semjuka, called Mwituni (the name compounded of *mwitu* a forest, and the locative *ni*.) The next stage, six hours, is to Ngorongoro; a thickly-populated Masai district with many villages. The country is full of big game, harboured in the neighbouring forest. A strong boma is made here, and the caravan remains about twenty days to trade and hunt.

The next march is to Kiaya, of six hours, a Masai town on a high hill. There is a spring on the summit, and the chief of Kiaya has made a big reservoir to catch and hold the water for the cattle in the dry season. Another man said it was a natural reservoir, but that it had been improved by the chief.

The next night is spent at a camp called Njogoma, in the Nyika, six hours from Kiaya. There is no well here, and water has to be obtained by digging in a likely spot. If, however, the season is very dry, it is probable no water will be found, and travellers ought to carry it from the last halting-place. There is a nullah here, but it is always dry except during the rains. The next camp is at Nduwai, five and a half hours west, where there is a spring of good water at the foot of the hill. The country around is open, with single isolated peaks rising abruptly out of the steppe. The following day's stage of five hours is to Maramwai, a Masai town of some size. Maramwai, who is the chief of the district, has a "thousand spears," or small standing army. He is not a very trustworthy individual, and the traders will not enter the town, but make a strong boma outside. There is a deep enclosed well here, many villages, and a large population in the neighbourhood.

The next stage of six hours brings one to Serengeti, a Masai town under chief Aramantuka. There are several wells here, with good water and much cattle. The country is very open, with a good

pasturage of short sweet grass, and no trees. This appears to be the limit of the Masai country in the west, for they are not met with again between this and the lake. As a rule the Masai wear no clothes, but on the line of caravan route they are beginning to buy cloth from the traders. They live entirely upon flesh, milk, and wild honey. It has commonly been supposed that the Masai have no permanent towns, but this is an error which has arisen from the habits of the Masai in leaving their towns utterly deserted during very dry seasons, while they go with their cattle, their families, and all their belongings, in search of good pasturage and water. When the rainy season has commenced they return again to their own towns. It is therefore not an uncommon occurrence for a traveller on his second journey to find a desert where he remembers a populous village, and a town where he only remembered a desert.

From this point, through the Ndorobo country to Ngoroini, there appear to be two routes. The first was given me by a man in whose account I detected several errors, and it is therefore not so trustworthy as the second. Maramwai to Masimani, three hours, a well at the foot of a mountain. To Uvurini six hours. To Birikani nine hours (I believe my informant confused Kiaya here, for *birika* is the Swahili for reservoir). To Nata six hours. To Ali Marau ten hours. This is a big town off the usual line of march, under a Mnyamwezi named Ali Marau, in the Ngoroini country. Then three marches across the wilderness, sleeping two nights in the Nyika, and the third morning entering Ngoroini. The second route is—Serengete to Kilibasili six hours. This is a settlement of the Wandorobo, a tribe of elephant-hunters, who neither cultivate nor keep cattle, but live entirely upon the flesh of the animals they kill in hunting. They supply the caravans with a great deal of ivory. Their country is full of elephants and other big game. They do not mix at all with other tribes.

The next stage of seven hours is to Ndoroboni, the centre of the country, where there are two towns of the Wandorobo. From the second town to Nata is four and a half hours. This is a big town on a wide fordable river from the north-east, running into the lake. The people are agriculturists, and have large plantations. Food and grain are very plentiful and cheap. The most influential man in the district is said to be Ali Marau, a Mnyamwezi immigrant.

The next march of three and a half hours is to Ngoroini, the chief town of the Wangoroini tribe, on a good sized river flowing out of a big forest in the north called Mao, and only fordable in the dry season.

The chief of the Ngoroini tribe is Nguko. These people have large plantations, and cultivate with energy. They are very friendly to the traders, and crowds will follow the caravan from Nata, trying to induce the travellers to buy their farm produce, quarrelling and struggling with each other in their eager endeavours to find a purchaser. The

country is mountainous, and the heights are well wooded, with big timber in the valleys.

The next stage of three hours is to Mtoni, a small village lower down the river, where there is a ford, "Mto-ni," "at the river." The next morning is spent in crossing, which is a work of some difficulty and danger, as there is from four to five feet of water at the ford.

The next stage of six hours brings one to Kwavini, a district inhabited by Wakwafi. The next three marches of three, four, and six hours respectively, are through a wilderness, of open grass country, good pasturage, and few trees, inhabited by wandering Wakwafi with their cattle. The last encampment is called Nyika. The next march is a long one of seven hours into the Ukosobo country. The Wakosobo are an agricultural people similar to the Wangoroini. They live in small villages without any chief for the whole country, but each little village has its own headman. The country is populous. We now reach the Kavirondo country after a short march of two or three hours. The border town is Kabondo, and it has for an African town a large population. It is the biggest town in the land of Kavirondo, and is situated on a river running from the north.

The next stage brings one to Nyawa, the residence of the Sultan of Kavirondo. It is four hours' distance from Kabondo in a north-westerly direction. The Wakavirondo are agriculturists, and have large plantations. They are sensible people, kept in good order by their chiefs, and very sharp in their bargains. They wear no clothes and extract the two lower front teeth.

The terminus of the caravan is now reached after a march of three hours. It is a big Kavirondo town called Sendege, under the chief Sendege, who rules the second district of the country. In the north a range of high mountains is visible called Nanda. These mountains are inhabited by a tribe called Wananda, never visited on account of their ferocity. They are armed with bows and arrows, and large knives. They are constantly at war with the Kavirondo people and attack all strangers who venture near them. They were described to me as wearing knives on their arms, at their waists, and on their thighs.

Pangani caravans after spending some time at Sendege trading, usually return to the coast. The whole journey, going and returning, takes about seven months. Between Sendege and the lake there are only four marches, and one of my informants had made the journey with a caravan, and was therefore able to describe it to me. The first stage is from Sendege to Kajudu, five and a half hours, a big Kavirondo town. The people of this town are covetous and quarrelsome, and are rather fond of making a disturbance with the traders. On the journey now described, Sendege had to be sent for to reduce them to order, and he gave them a sound rating for their bad conduct. The next day's march of five and a half hours brings one to Kamrele, a big Kavirondo town on

a river flowing from the Nyanza, quite unfordable, and crossed by a rope bridge. Although I pointed out the improbability of this river flowing from the Nyanza, my informant insisted that it was so, but where it went to he did not know. The country is level and well cultivated. The next stage is a journey of five and a half hours to Seme, a Kavirondo town on a small river. The last march is from Seme to the lake, taking six hours. The people inhabiting this part of the lake coast are all Wakavirondo. There are many towns and villages. The people have plenty of canoes, and *mitepe*, a small vessel of the dhow species with a square sail. The lake is full of fish.

Thus the Victoria Nyanza is reached after sixty marches from Pangani, over an easy country, food and water plentiful, and no really great difficulties to contend with. A light well-armed European caravan might reach the lake in two months after setting out from Pangani. It would not be hampered with trading, and would frequently do two marches in one day, so that it would have a fair amount of rest on the road.

Northerly route to Kavirondo from Nyanja.—A second route through the Masai country to Kavirondo via Donyo Ngai is as follows. At Nyanja, described in the last route, the caravan leaves the westerly direction, and goes north a march of four hours to Nguru-wa-Komani, a sleeping place only, with water. The next day's stage is to Nguru-wa-Manyani, five hours north up-hill, a sleeping place with water. The Masai bring their cattle here to water. The next march is to Ngaruka, six hours north, an encampment on a river coming from the hills behind Langi, a Masai town near, under chief Kibayau. The next march is a long one of nine hours to a well called Masima-ya-nyoka. The country is open and waterless. Donyo Ngai is visible in the north. From this place to Donyo Ngai it is four and a half hours through an open pastoral country.

Donyo Ngai, or mountain of God, is very high; it is a volcano with a *minara* (tower or peak) on the top from which smoke is always ascending. Above the mountain there is a black cloud, always seen, even at midday in the finest weather and the sun shining brightly. Thunder and sounds like cannon firing are constantly heard. No fire runs down the sides, but at night a bright light is seen above the mountain. At the foot of the mountain are hot boiling wells, in which the pagazi cook their meat.

The next stage of six hours is to Ndalalani, a Masai town on the river Ndalalani, about 150 yards wide but shallow and fordable. Then to Nyumba-ya-mzinga, four hours, a camp near a big waterfall which sounds like cannon firing (Nyumba-ya-mzinga, i. e. house of the cannon). The next march of five hours is to Pinyinyi, a Masai town under chief Madogelani, on a large river from Songo, a district on the same high land as the last camp.

The next march is a long one of twelve hours to Ngurumani, a Masai district with plantations. The Masai here, besides their cattle, have goats, and also cultivate the land. On the left to the westward a mountain is visible.

The next stage of five hours is to Kitiangari. This district contains two towns only. The people cultivate their plantations. A mountainous range is visible on the left. The next day's march of four hours is Utini, an agricultural district and tribe. The people have large plantations but no cattle. A large river from the east runs through the country. The next halting-place is Mabokoni, three hours, a camp on a wide river from the north, shallow, but containing hippopotami. Then to Musiro, six hours, a camp on the same river. Then to Musiro-mkubwa, three hours and a half, a town on the same river Musiro, inhabited by a tribe called Wa-Laria, under a Masai chief named Sevi. These people cultivate and have cattle and goats.

The next halting-place is on the top of the hills behind Musiro-mkubwa, one hour. The next stage of three hours is to Migungani, a camping-place in a copse of thorny trees called *mgunga*. The next encampment is six hours to Lukuruto, on a wide river from Mao in the north. The next halting-place, four hours west, is Langata-magovi on a deep wide river from east running west. Then on to an encampment in Mao forest, where the caravan remains three days to rest. Fresh water and rivulets abound.

Mzituni to Lumbwa, a district inhabited by a tribe called Wa-Lumbwa. The rate of progress is slow according to the amount of trading done. Then a stage of six hours to a group of villages inhabited by an agricultural tribe called Virangwe. Then a stage of five hours to a ford over a river running from the north-east (?) crossed on stones. From Mtoni ("at the river") to Nyawa, six hours. Here the route joins the southern route, already described. Caravans usually come by the southern route to Kavirondo, and return by this northern route.

Short route to the Masai country, south of the Luvu.—The following is the route of a short trading caravan journey to the Masai country, starting south of the Luvu and passing through the north of Uzegura. This journey usually takes three months.

It first crosses the Luvu at Pangani to Mbweni, a village on the southern bank, and then a walk of five hours leads to Mseko, a Swahili village where the Wali of Pangani has a residence and a plantation. Then four hours to Mtero, a Swahili town. Then five hours to Gugweni, a Wazegura town. The next stage of six hours is to Kiwanda, a big Wazegura town with wells under chief Mohammed.

The next march of six hours is to Mahomoro, a Wazegura town with wells. Chief Mwanabutu. The next day's stage is to Luvu Rasse, five hours, a town with good wells. The next halting-place is Manundo, four half-hours; a Wazegura town.

The route continues from Manundo to Mbwego, a very large town under chief Machako, on the following day; a march of six hours.

The next stage is to Makonako, an agricultural district under a female chief named Kuni. There are many villages in this district; and it is a great place for mtama or Caffre corn.

From Makonako to Mgera, a town on a big river, is six and a half hours' walk. The river rises in the mountains to the north, and runs through the Nguru district. A high mountain is visible on the left.

The next day's march is to Kwa Jiwarani, three and a half hours' north, a town on a hill. This is the border town of the Wazegura, and the caravan now enters the Masai country, leaving all cultivation behind it. The next camp is in the Nyika or wilderness, and there being neither rivers nor wells it is necessary to carry water for the day. The next stage from the Nyika is to Kijungu, a Masai town with good water. A high mountain visible in the north-east.

There are now four long marches across the Nyika, uncultivated, uninhabited, and with water only at long intervals. From Kijungu to Kisima is a march of seven hours. A camping-place in the Nyika, with a well used by the wandering Masai to water their cattle. The next day's stage is to Nyanyerera, five hours' west. A marshy lake where the Masai water their cattle. The next march, of three hours, is to Misewa, a camping-place in the Nyika, with a well. A high mountain visible in the north. The last march is to Swakeni, a big Masai town under chief Swakeni. There is no cultivation, but good pasturage, and great herds of cattle. Many elephants in the neighbourhood.

The caravan remains here some time for trading and buying ivory, and then returns to Pangani by the same route.

The Usambara route.—Lately caravans to the Masai country and the Victoria Nyanza have taken a new route viâ Magila, instead of following the valley of the Luvu. This has been done to escape the extortions of Semboja, chief of the Wakilindi, who resides at Mazindi, and levies tribute on the caravans both going and returning. It has always been the custom to pay Semboja a *kodi* or tribute by all the caravans going to the Masai country; but the black mail levied on the return is contrary to African custom and has excited great indignation.

This route is hilly and difficult, the ground therefore covered by the caravans in a day's march is less than on more favourable ground. From Pangani to Mkuzi a march of eight hours across the Nyika. Mkuzi is the chief town of the border district of Makumba, under chief Sebiza. There is a good well here, and it is a station of the Universities' Mission.

The next day's stage of three and a half hours is over a rolling hilly country to Magila, the chief station of the Universities' Mission in Usambara. The next day's stage of six hours is to Zimbili, across the southern spurs of the Magila mountains. Zimbili is a tiny hamlet on the river Zigi.

The next halting-place, five hours' north, is Mtamboni, a deserted Bondei town now overrun by the Wadigo. There is a good well here. The next camp is six hours' north on a river in the Nyika; the country is hilly and difficult. Mtoni to a camp in the Nyika with a good well. The next stage is to Ulima-ya-Bomba (Mount Bomba), four hours' north. Then the next day to Bomba town, two and a half hours' north; a Uzegula settlement on the river Umba.

The next march of five hours north-west is to Makaba, a Sambara town under chief Makaba. The halting-place on the following day is at Mbuyuni, six hours north. This place is so called because there is here a hollow *mbuyu* or baobab tree always full of good potable water.

The next day's stage of seven hours is to Magruno, a river dry from December to March, but water can always be obtained by digging in the bed. The route now for several days skirts the Sambara mountains.

The next halting-place is Chweli-chweli, three and a half hours' march. It is on a river with plenty of water from the Sambara hills. The camping-place on the following day is Mtoni, four hours' north, on the Mbaramu river; the country is an uninhabited wilderness here. The next day's stage is to Mbaramu, five and a half hours west. The route here passes round a spur of the mountains and turns sharply to the left. Mbaramu is a large Sambara town under chief Mahambo, one of the sons of Kimweri.

The stage on the following day is a very long one on account of the scarcity of water in the Nyika through which the route passes. The camp is made at Ziwa-ni ("at the pond") a large marshy pond in the midst of an uninhabited wilderness.

The next day's march is to Gongo, four hours' north; a Sambara town under chief Kiangiro. There is a waterfall of some size close to the town. North of Gongo there is a range of hills running east and west which have to be crossed.

The next halting-place is Mashima, six hours' from Gongo, a camp at the foot of the Pare mountains. The hills are covered with villages and tiny hamlets of the Wapare, who come down to the camp to trade when they hear the guns of the traders announcing their arrival.

Mashima to Kisiwani, a five hours' walk. Kisiwani is a Pare village on the river Kisiwani. There are many Wapare villages on the hills around. The next stage, of seven hours, is to Kisingo, a district of many Pare hill towns.

The next halting-place is Mdimba, a four hours' walk; a camp at the foot of the hills. Villages of the Wapare on the hills around. There is no well here, and water has to be bought from the Wapare, who bring it down the mountains from the springs. Kilimanjaro is first sighted here.

The next day's march of six hours brings the caravan to the south end of Lake Jipe. The country here is uninhabited and uncultivated, Nyika only. Hippopotami and crocodiles are numerous in the lake. Jipe to

Minunyani, an encampment on the northern corner of the lake, six and a half hours.

The next day's stage is to Taveta, a large town of the Wakwafi, five hours from Minunyani. The town is on a good sized river running from Kilimanjaro into the lake. The chief is named Mavuni. Around the town there are large plantations and the people cultivate with energy. The Wa-swahili going into the Masai country leave their wives and female slaves here.

The next halting-place, Njoro, four hours north-west, is an encampment on a rivulet; country uninhabited. From Njoro to Mto-wa-bahari ("river of the sea") six hours. From Mto-wa-bahari to Mto-wa-Hima ("rapid river") five hours west; a camp only. The next camp is Mbuyuni ("under the baobab") four hours north-west on a river from Kilimanjaro.

All these rivers come from the mountain which has been on the right during the last four marches.

Mbuyuni to Ohaga, five hours north-west; a large town of the Wa-chaga on a spur of Kilimanjaro. Chief Mandara.

[A few words are needed in explanation of the accompanying map. In his original sketch, Mr. Farler assumed Kavirondo to lie somewhere near the head of Speke Gulf. We know, however, that Kavirondo lies much further to the north, and hence it became necessary to replot the itineraries. Unfortunately, neither Mr. Farler nor any of his predecessors furnishes information sufficiently exact to enable us to lay down correctly Sendege's town, or any other place near the lake; and only after a European traveller shall have succeeded in traversing the Masai country, will it become possible to bring some order into the chaotic mass of native information collected by European residents on the coast. In the small inset map in the upper corner we have laid down Mr. Farler's and Mr. Wakefield's new native routes, so as to bring them into accord with the older itineraries. Mr. Wakefield's itineraries have already been utilised by Mr. Ravenstein in the compilation of the Society's large map of Eastern Equatorial Africa.]

*Native Routes through the Masai Country, from information
obtained by the Rev. T. Wakefield.*

THE information contained in the following pages was obtained by the Rev. T. Wakefield during his many years' residence at Ribé, near Mombasa. His principal informants were Mbwana and Hami, two caravan leaders. The routes have been laid down on the Royal Geographical Society's large map of Eastern Equatorial Africa, and some notion as to the regions they pass through may be formed by reference to the map accompanying Mr. Farler's paper in the present number of the 'Proceedings.'

In the following itineraries the figures placed after the names indicate the distance from the preceding station in hours spent on the march, the letters the direction followed.

1. *Tavēta to Sendēge's in Kavirondo, 31 days or 222 hours.*

Mto wa Rómbo, 7 N.; Usēri, 5 N.; Kimangēla, 4 N.; Laitōkitok, 4 N.; Mto wa Miviru, 6 N.; Mārāgo ya Rānga, 6 N.; Lake Ngiri, 5 N.; second camp on Lake Ngiri, 6 N.N.W.; Māsīmāni, 9 N.N.W.; Mbārāvūi, 6 W.; Kaptūk, 10 N.; Mātiōma, 10 N.; Gwāso naēbor, 5 N.; Gwāso nyiro (Kūbwa) 6 N.; Masima Ndiwa, 6 N.; Gwāso Nyiro, 12 N.N.W.; Ngurumāni, 5 W.; Ngāre Kiti, 6 N.; Utimi, 6 N.; Mabokōni, 4 E.; Mōsiro (Msiro), 9 N.; Mto wa Migungāni, 6 N.N.W.; Nyāre Nyiro, 9 N.N.W.; Maji ya Tīmbi-tīmbi (spring), 9 W.; Ngāre Davāsh, 9 N.N.W.; Bāra or Mwituni ("camp in forest"), 12 W.; Mwitū, 12 W.; Kosōra, 12 N.N.W.; Mto wa Mabokōni, 7 N.; Miyāwa's in Kavirondo, 4 N.; Sendēge's in ditto, 5 N.

This route starts from the well-known district of Tavēta, near Lake Jipe, passes to the rear of Kilimanjaro, touches Ngurumāni, Utimi, and other places known from older itineraries, and terminates at the town of the Kavirondo chief Sendēge, within two or three hours' walk from the lake, and on a river flowing from Mau.

Kavirondo appears from all accounts to be the most important country on the eastern shore of the Victoria Nyanza. Mr. Wakefield's informant describes it as a great grass-clad plain, with a few detached hills and clumps of trees, but altogether without forests. There are many rivers, and after the rains they flood the districts which lie near them. The climate near the lake shore is hot, and the nights are sultry. Frequent bathing is resorted to as a palliative. The rains begin in May and end in December, and in addition there is a light fall of rain, earlier in the year, similar to the *vuli* of the coast. The winds are variable. There are no monsoons.

The Wa-Kavirondo are tall and powerfully built; their complexion is a deep black, their lips are thick and their noses flat. Some wear their hair short; others dress it in an elaborate style; others, again, shave the whole of the head with the exception of the crown, where a luxuriant tuft remains, or they shave half the head or a few patches only. Whiskers and moustaches are worn.

The women tattoo the stomach and the back, but the men do so only rarely. Dress is almost unknown. The women are content with a string worn round the waist, to which they attach a tail-like appendage made of bast. They wear no ornaments whatever, but smear themselves all over with beef-fat mixed with urine. The men wear iron bracelets on their fore-arms, as well as above the elbows. Their spears are long and have short blades; their shields are made of buffalo-hide, and are about 5 feet high and 3 feet wide. Neither swords nor knives are in use.

Both sexes work in the fields. Millet, beans, bananas, and inexhaustible supplies of sweet potatoes are grown. There are two harvests

in a year. A thick porridge, on festive occasions made with milk, constitutes the staple food, and is eaten with the hands. Split bananas or sweet potatoes, dried in the sun, are known as *makopa*. Cattle, sheep, and goats are reared. The huts are circular and roomy, and sufficiently high for a man to stand upright within them.

The Wa-Kavirondo are a peaceable people, governed by a large number of chiefs, none of whom claims a superiority, but they are quite able to hold their own, and in case of need do not shrink from war. As hunters of the elephant, buffalo, and rhinoceros, they exhibit much boldness. They also navigate the lake, their boats being made of planks sewn or pegged together, and sometimes provided with a sail made of *busāti*, a coloured stuff imported by them from the coast.

Mr. Wakefield's vocabulary of the Kavirondo language clearly shows that this tribe does not belong to the Bantu family, but is akin to the Yambo and Shilluk, on the Sobat and the Nile. The following are examples:—

<i>Kavirondo.</i>				<i>Yambo.</i>				<i>Shilluk.</i>
1. ashiel .. ..	..	..	..	arhelo .. ..	..	..	..	akie
2. ario .. ..	..	..	..	ario .. ..	..	..	..	ariaw
3. adéo .. ..	..	..	..	adago .. ..	..	..	..	adak
4. agnúwén .. ..	..	..	..	angaro .. ..	..	..	..	angonu
5. ábirie .. ..	..	..	..	abiyo .. ..	..	..	..	abitesh
6. áwishél .. ..	..	..	..	abikálo .. ..	..	..	..	abikiel
10. apáre .. ..	..	..	..	apar .. ..	..	..	..	apiraw

2. *Sendége's village to Likamurióngo, 10 days or 50 hours.*

From Sendége's to Kisúmo is 20 hours in a westerly direction, thence to Likamurióngo it is 30 hours, towards the north-west. The route skirts the lake throughout. A few hills are visible.

Two islands lie off Kisúmo, about six or seven miles towards the south-west. The larger of the two is about half the size of the island of Mombasa, and hilly; the smaller one is flat. Both are cultivated by Kavirondo, who attend the market at Kisúmo, which is held daily. Market-fees are levied there in kind or in beads.

At Likamurióngo the lake is seen stretching towards the north-west for an indefinite extent.

3. *Sendége's to Ukára, 10 days or 57 hours.*

Miyāwa's, 9 S.; Miji ya Miyāwa, 5 S.; Nyánja ("lake") 5 S.E.; Mto wa Māwe, 5 S.; Northern Upóndo, 5 S.; Southern Upóndo, 5 S.; Irángi village, 5 S.E.; Irángi, 5 S.E.; Mánga, 5 S.W.; Ukára, 8 S.

This route runs close along the lake, which is within sight throughout. The shore is level and covered with a light-coloured sand. There are a few hills, but the only mountain is Nandi, at a distance of about six hours' journey from the lake shores.

The starting-point in Ukára lies an hour and a half from the lake.

Near it are two islands, the smaller of the two at a distance of five miles, the larger one, which is about the size of Mombasa, being double that distance. Both islands are hilly and inhabited. The hills of Ukerewe are visible towards the S.S.W., one and a half or two days' journey off. Ukerewe is part of the mainland, and not an island. Both Mr. Wakefield's informants assert that Uganda lies to the south-west of Ukára, and can be reached in boats in a couple of days, and by land in four days.

The Wa-Ukára resemble the Wa-nika and Wa-pokomo. They are tall and muscular. Some wear the hair short, others shave the head, the crown excepted. They paint the body red with clay mixed in oil, and the arms and legs with white. Women wear kilts of bast-cloth or skins, and men a longer garment of like materials. The stomach and upper arms are tattooed. Their ornaments are few. They live in circular huts built over pits three feet deep, and covered with a conical roof. Like the Masai and Galla, they marry only when full-grown, and pay the dowry for their wives in cattle and goats. Both men and women work in the fields, making use of a rather heavy hoe. They grow millet, semsem, sweet potatoes, bananas, beans, pójo, wimbi, and kimanga, but neither Indian corn, cassava, nor cotton. The corn is either pounded in a wooden mortar or ground on a flat stone, beneath which a cow-hide is spread out to receive the flour. Porridge is the staple food. The domestic animals are cattle, goats, sheep of a superior kind, dogs, and fowls. Cats are not known. There are blacksmiths in the country who manufacture hoes, axes, and spears. Cooking pots of clay, and wickerwork baskets are likewise produced. Ukára can boast of a large number of populous villages.

The river which enters the lake in Ukára comes far from the eastward, and swarms with hippopotami and crocodiles. A tree thrown across it serves as a bridge.

Mánga, to the north of Ukára, is inhabited by the Watu wa Mánga, who resemble the people of Kosova in appearance and dress, and speak the same language. They till the soil and keep cattle, but although living so near the lake they have no boats. The Wa-Irángi, which come next, appear to be of the same race.

The Southern Upondo river flows out of the lake towards the S.E. by E. It is about a mile broad, but can be forded. Its banks are steep. The natives navigate it.

Crossing this river, the traveller enters Kavirondo, and soon reaches the Northern Upondo river, which is of the same size as the southern river, but appears to be full of hidden rocks, as the ferrymen use poles to feel their way.

The Mto wa Máwe or "stony river" is likewise encumbered with rocks. Its water is red, and it has a strong current. The boatmen here use oars resembling those of the Europeans on the coast.

At Miji ya Miyāwa lies an island, about two miles from the shore. It is inhabited by Wa-Kavirondo.

4. *Sendēge's to Ligōnyi, 17 days or 107 hours.*

Kákumēga, 5; Mnyōro, 5; Makangāni, 6; Maji tini, 7; Miji ya Wakwāfi ("village of Wakwāfi"), 7; another ditto, 7; Marēu, 5; Kizūngu, 5; Mto kwa Sundu, 16; Mji wa Sundu, 4; Mto wa Bombēa, 8; Magāre Mdōgo, 8; Magāre, 13; Ligōnyi, 11. All north.

The river of Kákumēga is larger than that of Sendēge, and much discoloured. Its current is strong, and it enters the lake near Kisūmo. There are no boats.

The river named after the chief Sundu is very wide, but fordable; that of Bembēa ("swing") is crossed on a suspension bridge made of creepers. Both these rivers rise towards the north-east.

Ligōnyi is inhabited by Wakuāfi, who till the soil, but have no cattle. The mountains here are as high as the Shimba range (near Mr. Wakefield's station), and stretch away towards the east and west. They abound in caves, some of which are a mile in length, very lofty, with pools of clear, cool water and tolerably light. The Wakuāfi live in them. They build a stockade across the entrances as a means of defence.

5. *Ligōnyi to Njemsi, 21 days or 141 hours.*

Kisimēti, 8 E.; Mtōni, 16 E.; Kibchagnāni, 5 E.; Māragwēt, 49 E.; Tīni ya Mlima ("at the foot of the mountain"), 9 E.; Likamasā, 24 S.; Kapté, 5 N.E. Kikwāta, 7 N.E.; Ligéyo, 6 S.; Mto wa Mikwāju, 5 E.; Njemsi, 7 E.

Kibchagnāni (Kibcharangāni) is a low mountain range which stretches away to the north-east, and is inhabited by Wandoróbo, who are the subjects of the Wakuāfi. A larger mountain, Chibchibte, lies nine hours to the north-west of it. It is wooded, and Wandoróbo live around its foot. It abounds in frozen streams, which only thaw about 11 o'clock in the morning. In crossing them the frozen water reaches up to the knees, and the legs sink down into it as into mud. This frozen water is dark in colour, but the water which runs from it when it melts is perfectly clear. It is very cold in this region, but not so cold as on the Settima mountains, which have to be crossed on going to Samburu.

Māragwēt is a lofty mountain mass, the top of which is occupied by the Wamaragueti, who till the soil and keep cattle and goats. It is the northern termination of a range of mountains of which Likemasā (Elkamasā) and Elgoyo (Ligoyo) are parts. From its summit Sūku is seen to the north, Nandi and Elkamasā to the S.S.W., Elgoyo to the S.S.E., Njemsi and Mbáringo to the east, Kibcharangani to the N.N.W., and Ligōnyi and Kitoshi's village to the west. From Māragwēt to Likamasā is a journey of six days.

6. *Njémsi to Sendège's, 9 days or 96 hours.*

Mr. Wakefield unfortunately gives no details of this route. The direction is said to be south-west.

7. *Dháicho to Samburu, 16 days or 131 hours.*

Dháicho to Mtóni, 4 E.; Mto wa Pili (jitini), 5 N.N.E.; Mto wa Kināni, 6 N.; camp, 11 N.N.W.; camp, 11 N.; Māji ya Mugūru, 7 N.; Gwāso (Ngāre) Nyiro, 8 N.; Migugāni, 8 N.; Masīma Mtānga, 6 N.; Masīma Mikōma, 6 N.; Mikomani, 6 N.; Masīma ya Māwe, 8 W.; Lesami's, 11 W.; camp, 23 N.; Rēiga in Samburu, 11 N.N.E.

Mount Kenia.

In the present revival of public interest in the snowy mountain region of Eastern Equatorial Africa, one of the objective points of the Society's new Expedition now preparing under Mr. Joseph Thomson, the following unpublished letters of Dr. Krapf, written soon after his return from his first journey to the more northerly of the two snow-clad peaks which he and his colleagues discovered, will be welcomed by our readers. The letters were addressed to Captain Hamerton, then British Consul at Zanzibar, and we are indebted for the use of the originals to Sir John Kirk.

It may be premised that Dr. Krapf is the only European traveller who has seen the snowy cones of Mount Kenia; at least, he alone has given a description of their appearance. Dr. J. M. Hildebrandt, who followed in Krapf's foot-tracks in 1877, with a small and wholly insufficient party of natives, and reached a point about 70 miles distant from the peaks, in the published accounts of his journey,* speaks somewhat vaguely of being within sight of them, but he gives no description, and adds nothing to our information regarding the mountain.

MOMBAS, 26th Dec., 1849.

"With a feverish hand I take the liberty to write to you only a few lines, informing you of my safe return from Ukambani to the north-west of Mombas. I went through many and great difficulties and perils, but the good hand of Providence has assisted me to overcome all

* Dr. Hildebrandt delivered an address on the general results of his journey to the Geographical Society of Berlin, which is published in the 'Verhandlungen der Ges. f. Erdkunde,' iv. 1877, p. 284. All that he says about Kenia is "Nur 3 Tagemärsche von meiner Station erhob sich der schneebedeckte Kenia. Von einem Punkte konnte ich sogar den geographisch wichtigen Winkel Kenia-Kilimanjaro fixiren!" Dr. Hildebrandt elsewhere makes no further mention of the triangulation here alluded to. He published no map, and does not say he made a survey of his route. In the way of survey, we have nothing beyond a valuable paper by Dr. Kersten on the traveller's observations for heights by aneroid and boiling point. Dr. Hildebrandt published a longer paper, full of important observations on the plants and animals he collected, in the 'Zeitschrift d. Gesellschaft f. Erdkunde,' vol. xiv. (1879), but in this makes no mention of Kenia.

and to return in such good health and such bodily strength as I enjoyed when I called upon you at Zanzibar after my visit to Usambara. The distance from this place to Kitui, a celebrated tribe in Ukambani, is about 150 hours' march, which I accomplished in 50 days exactly, staying only eight days with the chief Kivói, who received me well, and who would have permitted me to go with him to several other countries beyond Ukambani. After four or five months he will come to Mombas with a large ivory caravan, and he wishes that either myself or one of my friends should go back with him and see all the countries situated to the west and north of Ukambani. I have seen the snow-mountain Kilimanjaro in Chagga, and also a much larger snow-mountain to the north of Ukambani, from which rises the mighty river Dana, and probably also the Osi, which seems to be a branch of the Dana. In short, the journey was full of interest, and nobody prevented me from going wherever I liked to proceed to. . . .

"Since I came hither to get the money for my bearers, I felt feverish and therefore I cannot give you now a full account of my journey, but I shall write to you the details as soon as possible. Kivói wishes that boats might be sent up the river and fetch his abundance of ivory. I myself think that if that river be navigable as far as to the vicinity of the snow-mountain Kenia (as it is called) we shall have gained an immense advantage regarding the exploration of Central Africa. The British Government should by all means make the attempt of surveying that river which runs into the sea near Ras Gomaný."

"MOMBAS, 21st Jan., 1850.

"I trust that my last letter, written towards the close of the past year, has long ago fallen into your hands. In that letter I informed you of my safe arrival from Ukambani, and promised, with your kind permission, to give you in a subsequent letter the particulars of my journey.

"It was in the evening of November 1st, 1849, when I left my cottage at Rabbai, accompanied by four Suahilis and nine Wanikas, whom I had hired (each was to receive 9 dollars to Ukambani, or 10 dollars in case of my proceeding to the river Dana, the northern and north-eastern boundary of Ukambani) as bearers of my provisions and goods required as presents in Ukambani. Before I entered into the territory of Toruma (a tribe of Wanika, said to be the descendants of the slaves of the Portuguese who were at Mombas) I was called upon by the chiefs and requested to pay them 5 dollars for permitting me to pass through their territory. The same chiefs had previously been with me at Rabbai and peremptorily declared that I should not pass through their country if I refused to engage one or two bearers belonging to the Toruma tribe, a desire which I was compelled to comply with as its refusal would have thwarted my whole journey, the Wanika of the tribe Kiriamá

having peremptorily refused me a passage through their land. All this obstinacy of the various tribes near the coast is the result and fruit of the weak government of Mombas; whereas at the time when the Masrúe ruled the coast, any chief who would have ventured to molest a stranger recommended by the Mombas government would instantly have been cited to Mombas and cut to pieces and thrown into the sea.

"... I set out on my journey on the 2nd of November. We first crossed the river Muadshe, which forms the boundary between Rabbai and Toruma. It is a torrent, not a perennial stream. The country around that river is full of acacia trees, red sand, and has only here and there a spot fit for cultivation. In general the territory of Toruma is but little inhabited, though in point of geographical extent it surpasses almost every other Kinika tribe. It stretches far into the wilderness westward, for the Toruma people have been clever enough to understand their own advantage. They desire to have the sole avenue to the interior, and thus to secure to themselves the gain from the ivory trade with Ukambani and other countries; therefore they have, 10 years ago, repelled the Wanika of Rabbai, who at that time had an open access to the interior.

"In the evening of the 2nd November I lodged with Abbé Jome, a chief of another division of the Toruma tribe. It must be borne in mind that each Kinika tribe strikes off again into several under- or subdivisions, as though they intended to carry their republicanism to the extreme, in opposition to the despotic monarchies of Chagga and Usambara and of other countries in Africa. . . .

"On the 4th of November we entered the district Ngúni, which is the last division of Toruma toward the great wilderness. . . .

"Ngúni is a fine part of the country, and a great pity it is that it is left uncultivated. Having passed Kumbulu we came to the hill Ndunguni, which is about 150 to 200 feet high, and stretches itself from south to north-west all along the Galla country as far as Ukambani, and even beyond, so that its extent from the coast to the interior may amount to about 600 miles. It lies exactly like a girdle around the great Wakuafi wilderness which I should traverse, and of the Teita mountains which I mentioned in a former letter. . . .

"Having entered the wilderness, which is entirely destitute of inhabitants, though its soil would be suitable for cultivation, we were soon harassed by the want of water, as the rocky pits, in which the rain-water is collected, were empty in most places. These stony pits are not artificial but constructed by nature, and are of infinite value to the parched traveller, though the water contained in them has a very bad smell from the putrefaction of the plants which grow in the pits, and from the dung of the wild beasts. . . .

"Four days after we had passed Ndunguni we arrived at the foot of Mount Maungu, on the top of which is a village inhabited partly by

Wakamba, partly by Wateita. The mount is about 1800 feet high, and affords on its top a majestic view of the Wakuafi wilderness, of the Teita mountains, and even of a part of the snow-capped Kilimanjaro in Chagga. The inhabitants of Maungu have only a few years ago fixed their abodes on this mount, which previously was entirely uninhabited. It is an important place to travellers from the coast, as they can find water and provisions on this mount. The ascent is considerably steep. There is room enough for a large population to reside on the top, where the rain-water is preserved in natural pits of rock, and where there is plenty of soil fit for cultivating *mahindi*, *mtama*, and all things which a native of Africa may wish for: . . . From Maungu we took our course to Wa, another hill where we found rain-water. Had my people not been afraid of passing by the foot of Mount Ndara and Mount Bura, we might have considerably shortened our journey. But as they had been informed that lately a Mkamba and a Mkiriama-man had been killed by the Wateita, they could not be prevailed upon to take the shorter route to Ukambani. Hence we approached the Galla country eastward, but had much to suffer from the attempt. The jungle was horrible, and the want of water worse than all other difficulties. When we came to the river Woi, which rises on the Teita mountains, we found not a drop of water. From the Woi we traversed again a dreadful jungle, where we frequently could scarcely see the sky. . . . After a day's march from the river Woi we hoped to find water on a hill called Kangongo, but on reaching it we were utterly disappointed. . . . On the 16th November we started before daybreak, carrying with us what little water we had. At sunset we reached the banks of the noble river Tsáwo, whose cool and wholesome water I shall never forget in all my life-time. . . . I found the banks of the Tsáwo about 25 feet in breadth, and 15 feet high. The water is about two feet deep. It has a red appearance from the sand and clay which are in the river bed. There are no rocks in it, hence there is not the least noise to be heard. It has its source in the snowy mountain of Chagga, and terminates probably in the bay of Malinde, after it has run through the Galla country, and figured under the name of the river Sabáki, which actually runs to Malinde. . . .

"We continued our march on the 17th November. The road led us first over a barren tract of country north of Mount Théuka, which is about 6000 feet high. It was not till the second day after we had left the banks of the Tsáwo that we found again drinkable water. This pleasure was afforded us in the vicinity of Mount Ngolia and Dshulu, which latter mountain is about 7000 feet high, and stretches from south to north-west. The Dshulu keeps the wild Wakuafi and Masai who live in the vicinity of Chagga, from continually overrunning the Galla and Wakamba countries. Lastly we entered the territory of Kikumbuliu, which is the beginning of Ukambani. On the road to Kikumbuliu I had a fine and

clear view of the snowy head of Kilimanjaro. It appeared to be very near, though I was about six days distant from the majestic mountain, before which all other mountains, however high they may be, appear like little children before a full-grown man. In Kikumbuliu we met with Wakamba, who have constructed villages and live by agriculture. Their country is quite level, wooded, but has a good soil. The water is rare in Kikumbuliu at the dry season of the year. . . . From Kikumbuliu my road was more in a northern direction. After a two days' journey through jungle we arrived on the banks of the fine river Adi, which rises in Kikuyu, a country to the west of Ukambani. It is about 150 yards broad, but the water was at this time of the year only 1½ feet deep. The banks are from 20 to 30 feet high. It runs along the foot of a hilly range which stretches like a girdle around Ukambani and the Galla country, as I have mentioned above. The river is said to join the Tsáwo in the Galla country, and to run into the sea. . . .

"Having crossed the river Adi we had to ascend about 1500 to 2000 feet till we came upon the fine plain of Yata, where we had an immense view of all the countries around. On the heights of Yata we saw the wilderness through which we had travelled. We saw all the mountains at the foot of which we had travelled. To the west we saw other large mountains, and likewise to the east we saw the mountains which separate Ukambani from the Galla country. To the north lay the great expanse of Ukambani proper. . . . The Mohamedans are a great burden to a traveller in these countries, and if he can, he must avoid engaging Mohamedan bearers. They caused constantly some quarrel or other by their bigotry and fanaticism. . . .

"From Yata we descended into a wilderness called Tangái, by which the Galla make their inroads into Ukambani from the eastward. We were then in Ukambani proper. Having traversed Tangái, the country improved in our interest and estimation. It gets more peopled and cultivated. It is level; only now and then an elevation or a depression closing the view of the traveller.

"After four days' journey from Yata, we finally reached the hamlet of the Chief Kivoi, whose acquaintance I had made at Rabbai in 1848, when he had visited the coast of Mombas for trade. He at that time made no favourable impression upon my mind, but on my present visit I found him quite altered for the better. On receiving me into his house, he was extremely friendly and civil, and immediately complied with my wishes, when I told him of the object of my journey. He said he would take me wherever I liked. He himself wished to go to Kikuyu, but the river Dana was not fordable at the present season on account of the rain now falling around the snow-mountain Kenia, between Kikuyu, Uimbu, and Mbé. On my first interview he mentioned the Kenia as a larger snow-mountain than Kilimanjaro, in Chagga, and said that I could

see both mountains on an elevation at a little distance from his hamlet. He also mentioned that it was three days' journey to the river Dana, and six days to the Kenia or snow-mountain, which contains the source of the river, which is about 200 yards broad, and at the dry season of the year so deep as to reach the neck of a traveller crossing it. It is the privilege of the people of Mbé to carry travellers over the river. Kivoi then expressed a wish that the Governor of Mombas might send boats to fetch the ivory, which he (Kivoi) was annually sending to the coast with great trouble. On my asking whether there were no rocks or cataracts in the river, he answered in the negative.

Kivoi's plan was to take me with him to Kikuyu, where he wished to collect some ivory. Having performed this business, he intended to stay two or three months more at home, and then to proceed to Mombas together with myself. But this plan did not agree with me. In the first instance, my bearers would not wait so long without a large increase of wages; secondly I was without further means, as Kivoi had taken all my goods; thirdly, I was afraid of putting myself entirely into his hands; for I should have been at his mercy if my bearers had departed without me; fourthly, I felt the effects of the climate and food upon my constitution. From these and other reasons I preferred rather abandoning my plan of proceeding further to the interior. So I resolved upon returning to the coast, thinking it a wiser plan to make another separate tour to those countries which can be reached in the north of Ukambani. I found that in every respect I must be better provided with the means of travelling in these countries, especially at the rainy season, which commenced then in Ukambani and beyond. Hence I made only a stay of eight days with Kivoi, and then ordered my people to prepare for our return to Rabbaï. . . . I had here many opportunities of collecting geographical information from people of distant countries, who were with Kivoi. He has acquaintances among the Wanderobo, Kikuyu, Uimbu and Mbé people, who live in the north and north-west of Ukambani. From all the accounts I obtained through those people, I am led to think that a journey to the west and north of Ukambani is practicable, but the traveller must be prepared for a long stay in those countries, and therefore have sufficient means for his maintenance and conveyance. Furthermore I am fully convinced that a traveller must in this direction reach the sources of the White Nile. It is probable that this river, or a branch of it, rises in the north of Mount Kenia, which lies about two degrees south from the line. During my stay with Kivoi I frequently endeavoured to obtain a view of the Kenia, but did not succeed in my endeavour, owing to the clouds which were constantly hanging over the mountain, whilst I could distinctly see the snow-mountain of Chagga, which was visible from various places in Ukambani. However, in the afternoon of my departure from Kivoi's hamlet I got a fine view of the Kenia, which I saw stretching from east to north-west. On its back I observed two

horns towering heavenward. Now I could understand why Kivoi could say that the Kenia was greater than Kilimanjaro in Chagga, and that it was the second snow-mountain, for snow was on the horns or peaks, as we may call them. Three other rivers were said to run from the Kenia. These rivers join the head river Dana, which is undoubtedly navigable to a great distance. The only disadvantage is that its mouth is so very narrow, and only accessible to boats. It runs into the sea near Cape Gomany in Formosa Bay, which the natives call Ungáma. . . .

"The whole extent of Ukambani, from north to south, is a seven days' journey. This I was told of before I came to Ukambani, and since I have seen a great part of the country I do fully believe it. To the north-east the country is very mountainous, and also to the west.

"There are no chiefs, as in Chagga and Usambara. Their form of government is entirely republican, or rather patriarchal. Hence everybody can go where he likes, and do what he pleases. The Wakamba are fond of travelling—hence they are found in almost every country of East Africa. . . .

"On taking leave of Kivoi, I gave him the promise that perhaps one of my friends would come to him and ask for his assistance in proceeding to the west or north of Ukambani. Kivoi said he would forward him to any place he might wish for. . . .

"I then with all speed resumed my journey of return to the coast, which was effected in great marches, but in safety, as I have taken the liberty of writing to you in my letter written in December last.

J. L. KRAPF."

GEOGRAPHICAL NOTES.

Successful Journey of Lieutenant Wissmann across Africa.—News reached Berlin by telegram from Zanzibar on the 20th of November, that Lieutenant Wissmann, the companion of Dr. Pogge in the German African Society's expedition to Western Africa, had arrived there, having accomplished the journey across the continent which he contemplated when last heard of. Messrs. Pogge and Wissmann commenced their travels at St. Paulo de Loanda, in January 1881, and advanced rapidly into the interior in the direction of the capital of the Muata Yanvo, whom Dr. Pogge had visited on a former expedition, but being warned off that potentate's territory, they took a circuitous course to the north-east, exploring an entirely new region between the Kassai and the upper waters of the Congo. The last letter received from them was dated the 27th November, 1881,* in S. lat. 6° and E. long. 22° 22', and in that letter the intention of the two travellers to part company was announced,

* Vide 'Proceedings,' *ante*, p. 572; and map, p. 679.

Dr. Pogge having planned to return westward to plant a station, after accompanying Lieutenant Wissmann to Nyangwe on the Lualaba, the latter continuing eastward across Lake Tanganyika to Zanzibar.

The Swedish Polar Station in Spitzbergen.—Our Associate, Mr. A. H. Cocks, visited the Swedish scientific station at Thordsen, in Ice Fiord, Spitzbergen, on the 12th of September last, in company with M. Ch. Rabot and Captain M. E. Arnesen. They met with a hearty reception from the scientific members of the expedition, who are there settled in a substantially built house, and busily occupied with the work which is to occupy them throughout the long Arctic winter. The staff consists of MM. Nils Ekholm (chief), E. Solander, H. Stjernspetz, R. Gyllencreutz, V. Carlheim Gyllenskiöld, and S. A. Andrée, attended by six sailors well hardened by service in former Arctic expeditions. The party was landed on the 22nd of July, having been brought from Sweden by Captain Palander, who returned with the vessels on the 6th of August. Mr. Cocks informs us that the observatories were fixed and observations begun by August 15th, and that at the time of his visit all the instruments were at work except the anemometer. There is no inlet or haven of any description at Cape Thordsen, but simply a narrow beach from which rises a cliff about 160 feet high, broken only by the narrow outlet of one of the small rivers which constitutes the sole landing place. On the top of the cliff was a store-house filled with a supply of provisions which the kindly forethought of Oscar Dickson had caused to be sent there, for the use of Mr. Leigh Smith should he be led to escape by that way from his winter quarters in Franz-Josef Land. Coals and timber were stacked here for the use of the Swedish expedition; but the dwelling-house is situated nearly four miles away up the slope, and 290 feet above the sea-level, communication with the edge of the cliff being facilitated by a tramway. Near the dwelling-house is the astronomical observatory, and in the vicinity, but at a higher level (826 feet above the sea), is the place where the anemometer and anemoscope are to be fixed. Observations are taken each hour, and a system of watches is established for day and night.—Mr. Cocks and his companions paid a second visit to the station on the 19th of September; the temperature of the air at noon on that day was 33.80° (Fahr.), all the members of the expedition were then in good health.

Lieutenant Hovgaard.—Alarming rumours having been spread abroad regarding the safety of the *Djmphna*, with the Danish Arctic expedition on board, now frozen up in the Kara Sea, the Danish Government have taken steps to communicate with the vessel if possible. Sir Allen Young, on first receipt of the intelligence, with his accustomed gallantry and self-sacrifice, had offered his services to Admiral Irminger; but M. Gamel, the promoter of the expedition, according to the latest news, has engaged Mr. Larssen (who was with

the ill-fated *Jeannette* expedition) to start for Waigatz Island in search of the vessel. Mr. Larssen is to start from Copenhagen in a few days. A correspondence is also going on between the Governments of Denmark and Holland in view of a Dano-Dutch Expedition with the object of assisting the Dutch vessel *Varna* as well as the *Dijmphna*. No fears are entertained at present of the safety of the vessels and their crews.

New Russian Work on Afghanistan.—Dr. Yavorsky, a member of the Russian mission to Kabul before the late war, has just published the first volume of his 'Journey of the Russian Embassy to Afghanistan and the Khanat of Bokhara during the years 1878 and 1879.' The work contains a good geographical description of the countries visited by the embassy, and historical notes. It is accompanied by a map of the upper course of the Oxus, showing the route followed by the embassy, and several drawings.

Obituary.

By the death of the eminent Russian Admiral, Count Frederic B. Lütke, the "Patriarch of the Fleet," our Society has lost one of its oldest and most distinguished Honorary Corresponding Members.

Frederic Lütke entered the Russian Navy as a volunteer at the age of sixteen, and in 1817-18 made his first circumnavigation of the globe under the command of Golovine. This voyage decided his future scientific career. During four successive summers (1821-24) he was employed in surveying the coasts of Novaya Zemlya, and the narrative of these voyages forms one of the richest sources of our knowledge of that part of the Arctic regions. The four expeditions were conducted with special skill and scientific insight, and surpassed all previous enterprises in the same direction by the correctness of the astronomical and geodetic determination of positions. In 1826 Captain Lütke was entrusted with the command of an exploring and scientific expedition, consisting of the corvettes *Seniavine* and *Moller*, which returned to Cronstadt after an absence of three years and five days. The principal geographical results of this expedition were the determination of the positions of the chief points on the eastern coast of Kamchatka, of the country of the Koriaks and of the Chukches, from the bay of Avatcha to the north-east point of Asia; also of the islands Karaghinsk, St. Matthew, Pribyloff, &c., in Bering's Sea; the archipelago of the Carolines examined, from the island of Ualan on the east to the group of Uluthy on the west; twelve islands discovered, and twenty-six detached groups or islands described; as also the islands of Bonin Sima. The *Moller* had in the meantime discovered Moller Island in 25° 46' N. lat., 171° 50' W. long., and examined the chain of islands and reefs which extend north-west from the Sandwich Islands. She discovered, also, a dangerous reef six miles S.S.W. of Lisiansky Isle, and afterwards surveyed the north-western shore of the peninsula of Alaska. Experiments with the invariable pendulum were made at nine stations, besides magnetic and meteorological observations. Rich zoological collections were made, which included 300 species of birds, 300 of fish, 700 of insects, and 150 crustacea. The botanical collections comprised 2500 specimens of dried plants and of *Algae*; and 330 specimens of rocks were brought from the various points touched at. The ethnographical results included a

vocabulary of upwards of 200 words and phrases, besides the numerals, in four dialects of the language of the Caroline Islands, compared with several other dialects of Polynesia; also descriptions and portraits of the Chukches, the Koriaks, the natives of the Caroline group, &c., and the Bughi, of Celebes; a collection of costumes, arms, ornaments, &c. In the course of the voyage 1250 drawings were made, some of which give an excellent idea of the characteristic vegetation of tropical climes. A detailed account of this memorable voyage and its rich results was published, under the title of '*Voyage autour du monde sur la Corvette le Seniavine en 1826-29*,' in 1835 *et seq.* The geographical portion of the work is illustrated by various plans, charts, views of headlands, &c.; and, more especially, by an excellent chart of Bering's Sea. The third volume was the joint production of Dr. Mertens, M. Postels, and Baron Kittlitz, naturalists to the expedition, and contains much valuable information on geology and natural history. For this voyage, the Demidoff premium was conferred upon Captain Lütke by the Academy of Sciences at St. Petersburg.

Within a few years of the return of the *Seniavine*, Lütke was nominated aide-de-camp to the Emperor, and governor—afterwards guardian—to the Grand Duke Constantine Nicolaivitch. He passed rapidly through the various grades of the military and administrative services, and was made aide-de-camp general in 1842, vice-admiral in 1845, naval governor and commandant of the port of Revel in 1851, and was transferred some years later to Cronstadt in the same capacity. In 1855, he was nominated member of the Imperial Council, and was raised to the rank of Count on the fiftieth anniversary of his entering the service. For many years he directed the work of the Imperial Russian Geographical Society as Vice-President—the President's chair being occupied by the Grand Duke Constantine Nicolaivitch—with all the zeal and activity which characterised him to the last. He retired a few years ago, "to make room for the young ones," as he was fond of saying, but he never ceased to take a benevolent interest in the work of the Society, and to support its various enterprises. In 1869 he was called upon by the late Emperor to succeed Count Bloudow as President of the Academy of Sciences, and he occupied this post with distinction to within a few months of his death, when advancing age and infirmities compelled him to ask to be superseded.

Count Lütke was not only a distinguished navigator and man of science, but his liberal and cultivated mind led him to sympathise with almost everything to which human interest attaches. He was firm in his own convictions, but showed great forbearance and courtesy to others, while his kindness and frankness, his genial temper, and strength of character, won the affection and respect of all who had the privilege of his acquaintance. He had seen much, and read and retained much, and had a singular charm as a narrator. With all this he was modesty itself, and listened with winning deference to others.—This sketch of his leading characteristics would be incomplete unless mention were made of his keen love of music. Until two or three years since, Count Lütke was to be met at all the choicest musical gatherings in St. Petersburg, and his expressive features showed that he followed the performance with the appreciation of a connoisseur. He died on the 20th of last August in the 85th year of his useful life, and his funeral was attended by several members of the Imperial family, by whom he was much liked and respected.

REPORT OF THE EVENING MEETINGS, SESSION 1882-3.

First Meeting, 13th November, 1882.—The Right Hon. Lord ABERDARE,
President, in the Chair.

ELECTIONS.—*Alfred J. Burrows, Esq.; James Carlton Eckersley, Esq.; George Grenfell, Esq.; Rev. Thomas Phillips.*

The PRESIDENT, in opening the Session, spoke as follows:—

I propose to adopt this evening the course which I have pursued on each preceding occasion when I have had the honour of addressing you at the first meeting after the vacation, and that is, not to read a formal address, but simply to recall some of the principal events that have occurred since our parting at the end of the last Session.

In one respect, however, I shall venture to depart from the usual custom, namely, that which is followed with regard to deferring notices of the distinguished members of the Society who are lost to us by decease, to the Summary in the Anniversary Address in May, and this because we have recently lost so eminent a member of this Society, and by a death so tragic, so sudden, that I am sure you will expect that the President of this Society should not pass it altogether over in silence. I refer to the loss of that most distinguished traveller, Captain Gill. Captain Gill was still in all the vigour of his age, having been born in 1843. He was born in India. He was educated for the army, and entered the service in the year 1864 as an officer of the Royal Engineers. For several years he served in India, and in 1873 having returned, and having succeeded to a considerable fortune, he determined to indulge the darling wish of his heart, which was to occupy himself in travelling in some new and difficult country. He tried his "prentice" hand in the region along the borders of Persia and Trans-Caspian Russia, in company with Colonel Valentine Baker, and published an account of his journey soon afterwards, with a map, in the *Geographical Magazine* of 1874. But his principal journey, that by which he is best known, and that by which his name will descend to posterity, is the expedition that he made into China. In 1878 he indulged in the ambitious project of travelling through the north-western provinces of China, and endeavouring to penetrate to Kashgar, and thence to Europe. He was defeated in his main object, and turned his course aside to the province of Szechuen. There he travelled over districts hitherto unvisited by Europeans, and made his way eventually through Yunnan and Burma home again. During some part of that journey he had the inestimable advantage of the society of a gentleman whom I am happy to see is present this evening—Mr. Colborne Baber, Chinese Secretary of Legation at Peking, himself an accomplished traveller, who has a thorough mastery of the literary and colloquial language of the country. Captain Gill was enabled, after leaving Mr. Baber at Chung-Ching on the Yang-tsze, to carry out successfully his expedition via Cheng-tu to the Min Mountains and the borders of Tibet, and thence by Lithang and Bathang and across the Kinsha, the parent stream of the great Yang-tsze, to Tali-fu, on his way to the Irawadi. An account of this important journey was given by him in this hall, and was published afterwards in our Journal, with a map reduced from his own elaborate route-survey in 42 sheets, from which the best maps of that region have since been drawn. For this work he received in 1879 one of the royal medals annually given by this Society, and in the next year a similar honour was awarded him by the Geographical Society of Paris. The work which was done became afterwards more

popularly known by his very attractive book of travels called 'The River of Golden Sand.' After returning home, he was soon afterwards taken into the Intelligence Department of the War Office—that excellent institution which, borrowing a good idea from our neighbours, we have added to the military institutions of this country, and in the employment of that Department he soon afterward indulged his taste for adventure by making two difficult journeys, not without danger—one near the end of the Afghan war, from Afghanistan towards the district of Merv, and the other during the French military operations in Tunis, into the desert of Tripoli. He had hardly returned home from that last-mentioned expedition, when he was sent out by the Government on public service to the Red Sea; and it was there in August last that he met with that sad and tragic fate with which you are all familiar. All I would say of him is that this country has lost in him not only a most valuable and promising officer, but a traveller of great enterprise, courage, endurance, and perseverance; added to accurate scientific knowledge and well-trained powers of observation, and with the power also of recording what he had seen in appropriate language. You may remember the last occasion he appeared among us, when he read us extracts from that admirable paper of Mr. Baber's on an expedition he had made in the mountainous region of Western China which interested us so much, and which was published separately as the first part of the Supplemental Papers issued by this Society.

With Captain Gill at the time of his death was a gentleman of equal, perhaps I may say in the literary world of almost superior eminence—I mean Professor Palmer. Professor Palmer was not primarily a geographer, but a linguist and Oriental scholar; for although he knew most of the languages of Europe, he was most distinguished for his profound and, as far as this country is concerned, unrivalled knowledge of Arabic and other Eastern languages. But he was not unconnected with this Society; for at the commencement of his career as an Eastern traveller he was employed in an exploration of the Sinaitic region under the management of the late Sir Henry James, of the Ordnance Survey, towards the expenses of which this Society in 1868-9 contributed, and it was during that expedition that he discovered, as we were informed at the time by the Rev. F. W. Holland, the key to the interpretation of the old Sinaitic language, and copied upwards of 2500 inscriptions in the same tongue. He collected besides the materials for an interesting book of travels, 'The Desert of the Exodus,' which he soon afterwards gave to the world. Professor Palmer appears, from all the accounts given of him, to have been a man of the most extraordinary combination of varied attainments, and to have united to all these great gifts a most attractive disposition, which made him loved by all his friends. That two such men should be lost in the same death is, I think we shall all agree, a national misfortune.

Having paid due observance to the memory of two men so distinguished as these gentlemen connected with the operations of this Society, I pass to a more agreeable topic.

You may recollect that when we last met great anxiety was felt throughout the country, and especially by this Society, with respect to the fate of Mr. Leigh Smith, who had sailed in the summer on his second voyage of exploration to Franz-Josef Land, one of the discoverers of which (Lieutenant Payer), I am happy to say, is present with us this evening. Mr. Leigh Smith had, on his previous voyage, navigated the western and southern coast of that great island, to the extent of 150 miles. Animated by his success on that occasion, he determined to return there, at his own cost, the following year. He went there, and, as you know, he did not return that year, and very great anxiety was felt for his fate. It became my duty as President of the Society to address a letter on the subject to the First

Lord of the Admiralty, who also, I am happy to say, is present with us this evening. From him the Council of the Society and myself met, as we were sure we should meet, with the most cordial and sympathetic reception, and the result of our interview was that the Government agreed to contribute a sum of 5000*l.* towards the cost of that expedition. With the full consent of the Fellows of this Society, the Council also advanced the sum of 1000*l.*, and Mr. Leigh Smith's cousin—Mr. Valentine Smith—then took all the best measures for ensuring the relief of his distinguished relation.

It so happened that the negotiations with a most competent officer were broken off rather late in the day, and Mr. Valentine Smith felt much anxiety as to the choice of some competent person to take charge of the expedition. In the moment of difficulty Sir Allen Young, already so well known to us at once for his benevolence and for his Arctic enterprise, undertook to take charge of the expedition, and I think you will agree with me that no more competent man could have been chosen because of his varied Arctic experience, his coolness, and his decision of character. Well, Sir Allen Young arrived at Novaya Zemlya in the middle of July. On the 17th of July he incurred one of the risks which frequently accompany navigation in those seas, and especially in a case like his. Of course, going as he was in search of men who may have lost their ship, it was his duty to coast very near the shores of Novaya Zemlya, and in doing so he got upon a reef and very nearly suffered shipwreck. Fortunately he was able to escape, and went into the Matotchkin Strait, which separates the two portions of Novaya Zemlya, to refit. Whilst there on the 3rd of August he fell in with Mr. Leigh Smith and his party, and had the great happiness of restoring them to their native land. You will have seen in the papers the interesting account of how Mr. Leigh Smith and his companions escaped from the danger in which they were placed, how they spent their winter, and how having lost the greater part of their supplies they yet contrived not only to keep body and soul together, but to remain in excellent health, to effect the stormy and dangerous passage between Franz-Josef Land and Novaya Zemlya, and to return to this country without the loss of one life except in the case of one unfortunate person who had carried with him there the disease of which he ultimately died. I am happy to say that on a future occasion, probably early in January, we shall hear from Mr. Leigh Smith himself a more full and detailed account than that which he has hitherto given of his adventures in those frozen regions.

Did time permit me, I might enlarge upon the further Arctic adventures which have been carried on since we last met. They are mostly connected with founding stations for circumpolar observations, but I am obliged to pass on to other subjects, and I will simply at this moment refer to the additions to our geographical knowledge which have been made in the past year in Western Africa. Mr. Stanley, who has performed so many extraordinary feats of daring travel, was engaged in making a practicable route between the Lower Congo and Stanley Pool, which is at the head of a series of falls and rapids. He had to cut his way for, I think, 160 miles through the forest, and he not only succeeded in doing that, but also in adding very considerably to our knowledge of the Congo above Stanley Pool. He has largely investigated those regions. He has, I believe, discovered a considerable lake not hitherto known, and it was our hope, and indeed we had from him a conditional promise, that on the 27th day of this month he would have given us an account of his further discoveries. Unfortunately he has been called away to Brussels: he is now abroad, and it seems doubtful whether he will be able to return in order to keep the promise which he made with the knowledge that he might not be able to fulfil it. But his is not the only addition to our knowledge of those regions. His rival in African exploration—and I am sure you will not expect me to enter into the

subject of the special aspects which that rivalry has taken—Lieutenant de Brazza, has also considerably increased our knowledge of the regions between the river Ogowé and the river Congo. He, too, has discovered a route which, according to his description, will probably hereafter constitute the easiest and most direct route to Stanley Pool and the waters of the Upper Congo, which I need not say open up a vast region in the interior of Africa.

These are the principal events of the few months that have elapsed since we last met, and it is now my duty to introduce to you the gentleman who is about to address us this evening. Mr. Colquhoun is one of the five or six gentlemen who of late years have added very largely to our knowledge of South-Western China. He has established the fact that Yunnan, instead of being, as it was supposed to be, a vast mountainous and barren district, is one of the richest portions of China, and that the richest part of the province lies on the border of the friendly country of the Shan tribes, and near the frontiers of Burma. There is every reason to believe, therefore, that one of the most productive portions of China may be approached through a friendly region on the side of British Burma, and one of the great objects of English and European commerce, that is, a more direct communication with the populous and productive western provinces of China, may be obtained through this route.

The following discussion ensued on the termination of the President's opening remarks, and Mr. Colquhoun's paper :—

Lord NORTHBROOK said the paper which had just been read was a most interesting one, and he could assure the Society that Mr. Colquhoun's journey had attracted great attention from the Government of India, because he had recently received letters both from Sir Charles Aitcheson, Lieutenant-Governor of the Punjab, who was formerly Chief Commissioner in Burma, and Major Evelyn Baring, Finance Minister of India, especially commending to his notice the journey of Mr. Colquhoun. From what he had heard to-night, certain parts of that journey were of great political importance to India, and more especially the discovery that the Shan States on the borders of Burma and Siam were now independent both of China and Burma. But those subjects would no doubt be noticed by gentlemen present who were far better able than he to express an opinion in regard to them, and, indeed, he would not have ventured to address the Meeting if it had not been for some remarks which fell from Lord Aberdare, in his preliminary observations, upon the subject of the recent deaths of two friends of his—Captain Gill and Professor Palmer, both of them eminent men, and one of them a distinguished member of the Royal Geographical Society. He would not like those remarks to pass without offering a few words. He was himself so much concerned in their mission to Egypt, that perhaps the Society would like him to explain how it came about that they went there. In the middle of last June, before the commencement of hostilities, and before the fleet had attacked the forts of Alexandria, but when it was pretty clear that the state of affairs was critical, and that England might be called upon to interfere in Egypt, and possibly to protect the Suez Canal, it became his duty to ascertain here in London, if he could, the condition of the Bedouin tribes of the desert of Sinai, and to find, if he could, any one who knew the then condition of those tribes. In order to obtain that information, he got the assistance of his friend Colonel Bradford, a distinguished officer in India, and also of Captain Gill, who was then attached to the Intelligence Department of the War Office, who had himself recently travelled in Tripoli, and who, although not a great Arabic scholar, had had some experience of the Bedouins. Those gentlemen were engaged in investigating for the Admiralty the condition of the Bedouin tribes. After a time they told him that the gentleman

here in England who knew most about the Bedouins was Professor Palmer, the Professor of Arabic at Cambridge. With his assistance they drew up an account of the different tribes and Sheikhs. In the course of the preparation of that account Professor Palmer was asked if he could recommend any one who, from his knowledge of the language, could be relied upon as an interpreter to deal with the Bedouins, and Professor Palmer most gallantly at once volunteered to undertake the duty himself. He left England at the end of June, and his plan was to start from Gaza, to cross the desert, and to arrive at Suez, in order to avoid any interruption to or suspicion of his object. He touched at Alexandria, started from Gaza, travelled to Suez, and arrived there on the 1st of August. His instructions were, in passing through the desert, to ascertain the feelings of the Bedouins, and to be prepared when he arrived at Suez, supposing hostilities had broken out, to act under the service of Government as interpreter. When he started, hostilities had not broken out, and it was not at all absolutely certain that they would occur. He reported that he found the Bedouins were well disposed, and that he expected to experience no difficulty in getting camels. In the meantime hostilities had broken out, and the moment that occurred he (Lord Northbrook) sent for Captain Gill and asked him if he would like to go to Admiral Hoskins, who was in command of the ships there, to assist in the Intelligence Department. Captain Gill, with that high spirit which was so well known, at once joyfully accepted the employment, and arrived at Suez a day or two after Professor Palmer. It must be understood that this was after hostilities had commenced, but before the British troops had arrived at Alexandria, and before even the Indian troops had arrived at Suez. Arabi had been receiving information by means of the telegraph which passed through Constantinople, crossing the Suez Canal at Kantara and going thence to Cairo. It was important to cut that to prevent Arabi having notice of the movements of our troops. Admiral Hoskins entrusted that duty to Captain Gill, and Captain Gill went from Ismailia to Suez. He there found Professor Palmer, and with a gallant young officer, Lieutenant Charrington, they went into the desert, Captain Gill with the intention of proceeding northwards to cut the telegraph wire, Professor Palmer and Lieutenant Charrington intending to go to Nakhil to meet one of the Sheikhs and purchase camels. A few days after they started on the 8th of August they met with their sad fate. That was the simple story of their employment in Egypt. The work which Captain Gill undertook was one of great danger. To cross the desert and to cut the telegraph at that time was a very dangerous enterprise, and he believed that Captain Gill was well aware of the danger when he undertook it. He did not wish to dwell upon this sad story, but they must all feel that those three men well represented the spirit of this country. There was a man like Professor Palmer sacrificing all his learning to the service of his country; Captain Gill, a scientific soldier with a considerable fortune of his own, ready to go out at once upon any enterprise which could be of use to his country; and the gallant young sailor going with them in a spirit well worthy of the distinguished officer, Sir William Hewett, whose flag lieutenant he was. This national spirit was not unknown in the Royal Geographical Society. The spirit of adventure was one which they were accustomed to hear of fortnight after fortnight. The spirit of devotion to duty and devotion to their country was shared by all those who gave the Society accounts of their travels and adventures, which were seldom without peril, in distant lands. Among them not the least, certainly, was the modest account that they had listened to from Mr. Colquhoun.

Sir JAMES BAIN, as a director of the Chamber of Commerce of Glasgow, under whose auspices Mr. Colquhoun had taken his journey, said that they were very much delighted to have heard the paper which had been read. Of course, in meetings of the Society such accounts were always looked upon from a scientific point of view,

but he was very glad to say that Mr. Colquhoun was going down to Glasgow, and would there explain the particular routes of his journey and the advantages which might arise to commerce in connection with them. He himself had been in China lately and knew something about the country, and he felt sure that it was through the British provinces of India and Burma that China would be approached in the most effective manner. Attempts had been made by the French to enter China by Tongking, but he was convinced that the true, and best, and most advantageous route would be through the British provinces.

Colonel YULE said he had taken the greatest interest in the subject of Indo-China almost as long as he could remember. He had read a great deal about it, thought a great deal about it, written a great deal about it, and now he had to talk about it. The name of Indo-China was comparatively modern; he believed it was only invented by Dr. Leyden about the beginning of the present century; but it was a very happy name, for it expressed the character of the region in a way which perhaps the inventor of the name did not fully appreciate. It was connected with China by ties of blood and language, whilst it was connected with India by an immense diffusion of Indian influence in religion, in polity, in arts, in manners. That Indian influence was of very great antiquity, and it was not known when it began. The earliest trace of the region in literature was in Ptolemy's tables, in which a great number of names might be found along the coast, obviously Sanscrit in their origin. This showed that at that time—about the Christian era—there were Hindoo settlements along the coast, as far at least as what was now called Cochin China. Those names still pervaded the whole country. The name of the famous river, the Irawadi, was identical with that of the river running by Lahore, which was now called *Ravi*, but properly *Airavati*, and which the Greeks in Alexander's time converted into *Hydraotes*. In the early days of European knowledge of India, in the Portuguese times, there was a good deal of going to and fro over that country. The Portuguese adventurers joined the armies of the various great monarchies that occupied the Indo-Chinese peninsula, and in the book of Fernam Mendez Pinto a most curious picture of the country before the middle of the sixteenth century was given. It was full of extraordinary accounts, a sort of phantasmagoria of millions of soldiers, thousands of elephants, temples thousands of feet long and almost thousands of feet high. Evidently these were not facts, and it was impossible to verify Pinto's geography; but yet it was a series of dreams and pictures founded upon fact. After that a veil of darkness fell upon the country so far as European knowledge went, and it was only within the last thirty years that the veil had begun to be lifted. The first who penetrated the unknown country was Major Sladen with Dr. Anderson, who were sent on a mission via Bhamo. They, however, merely crossed the Chinese frontier, and were obliged to turn back. At the same time that Major Sladen was travelling slowly to Bhamo, the great French expedition, of which Mr. Colquhoun had made generous mention, was travelling from the sea at Saigon up the great river Mekong, reaching Tali-fu, and returning to Europe by Shanghai. That journey threw the greatest light upon the country that had ever yet been thrown upon it. It was probably the greatest journey that had yet been made in Indo-China, and perhaps Mr. Colquhoun's was the next greatest. The former threw a shaft of light through the country from the south to the north; Mr. Colquhoun had now thrown a similar shaft from east to west. It was impossible as yet to appreciate what the results of his journey would be, but it was evident from the admirable paper that had been read that when his book was published many treasures would be found in it. He (Colonel Yule) had always had great doubts about the practicability of superseding the present access to the rich provinces of China by any approach from the Burmese side, but Mr. Colquhoun had produced two new and

important facts. The first was that alluded to by Lord Northbrook, viz. that the Shan States were now independent of the interference of the Court of Burma: that would be very important as regards any communication attempted to be made through the country. The other particular was the superior richness of the corner of Yunnan lying nearest to the British possessions. Still he did not think that the calculations about the number of days' journey were quite clear. The railway alluded to was still *in nubibus*, and he hardly could guess how it would be made, or where it would terminate. However, he highly appreciated Mr. Colquhoun's venturesome journey. Mr. Colquhoun seemed to him one of those men who were born with a genius for travel, as some were born with a genius for poetry or mathematics. It was curious how these men sprang from every profession and every class of life. There was Livingstone, a weaver and missionary; Bruce, a Scotch laird; Ledyard, a Yankee waif; Mungo Park, a country doctor; Burton and Grant, soldiers; and now we had a born traveller issuing from the Indian Public Works Department, a civil engineer. He hoped that when Mr. Colquhoun returned to India he would find scope for that genius for travel, without disparagement to his rise in the department to which he belonged.—He felt compelled on that occasion to allude to one subject of which the President had spoken, and in regard to which Lord Northbrook had come forward so honourably to make frank revelations of matter not yet published in the press, viz. the journey of Captain Gill. Some strange Nemesis seemed to have hung over the fate of the earliest travellers who rent the veil hanging over Indo-China. Francis Garnier, Cooper, Margary, and now Gill, had all met with violent deaths. It was a most remarkable circumstance, and to him a strange and sad experience, that last month, within only ten days, he was twice called upon, through no action of his own, to write notices for the public press of two friends of his, both most eminent by what they had accomplished, still greater in their promise, both young enough to have been his sons: the one, Arthur Burnell, a scholar, and a ripe and good one, the greatest scholar probably in the lists of the modern Indian services, a man of high qualities, but essentially a man of books; the other, William Gill, a man to whom action was everything, a man, who, with reserved and taciturn manners in company, had beneath that undemonstrative exterior an ardent soul, a soul of fire! He was never weary of offering his services; there was no labour that he was not ready to undergo, no danger he was not prepared to face, and still more, he was ready to face the weariness of waiting and the monotony of temporary failure, for his country's service; and all this at his own charges; literally spending and spent in the public service. By the kindness of his family he (Colonel Yule) had lately had placed before him an immense mass of Captain Gill's journals, which he kept through all his wanderings and sent home for the perusal of his mother (for he was not only a good soldier, but a good son); and he had been astonished to see in how few years such an immense mass of labour and daring enterprise was compressed. It appeared to him as if Captain Gill, in his ardent and loyal spirit, had wrested from the hands of the enemy the pet adage of traitors, and had bound it round his own gallant brow as his badge, "England's necessity is my opportunity!" He trusted that there would be no difficulty about providing for such of the families of the unhappy gentlemen as might require such provision. The commission on which they went was no ordinary one; the tragic fate they met was no ordinary one; they were no ordinary men; and England should show that she felt it. In Captain Gill's journal one passage struck him where, in his solitary wanderings in Tripoli, with no one to speak to, he communed with himself in his diary, and said something to the following effect: "I have been wondering what constitutes a great Power, and I have come to the conclusion that a great Power is that which protects its subjects wherever they may go." It

might not be but that disasters should sometimes come; but in spite of all that had come and gone, he trusted that it might still be said in England, when crime and treachery were in question, "Woe to those through whom they come!" But beyond this he thought it behoved England to take care that some memorial was erected to those three gallant men, whether at Westminster or in St. Paul's, some tablet at least to commemorate their names, their careers, their tragic fate. Lord Aberdare had alluded to those written rocks which Professor Palmer had deciphered. He (Colonel Yule) would like to see one addition to those rock-inscriptions of Paran, viz. a tablet carved high on that fatal cliff, and on it in Arabic and English words, which could be read a mile off: "Go, Traveller, and tell in England that we three died here in obedience to her behests!"

Sir THOMAS WADE, after expressing the pleasure with which he had listened to the paper, said that six years ago he had the gratification of receiving Captain Gill under his roof when he was exploring between Peking and the Great Wall. He was then exceedingly impressed with the qualities which Colonel Yule had referred to, namely, the quiet energy which characterised Captain Gill. He wished to offer his congratulations to Mr. Colquhoun, not only for having completed a journey of singular interest from a geographical point of view, for he might be said to have discovered a new country, but also for the prospect he had given of commercial advantages by the route he indicated, whenever it became practicable in the manner which he hoped. He perfectly agreed with Mr. Colquhoun, that Yunnan is a province of which it would be vain to speak in the same way as if they were dealing with a country, say like Russia, which was very much more considerable in extent, a country, access to which at one point gave access for trade to the whole. The mountain systems of Yunnan so divided the country, that it had naturally become a matter of consideration to geographers and explorers which of several routes would be the best in order to introduce trade or to draw the produce to the coast. The testimony of Mr. Baber and that of his two able successors in charge of the port of Chung-king, namely, Spence and Parker, had perfectly established that the mountain barrier to the north of Yunnan rendered the introduction of British commerce into Yunnan by the valley of the Yang-tze almost impossible. In Mr. Baber's opinion the most natural port of entry was Hanoi, by the route which might be said to be in possession of the French. But he thought that Mr. Colquhoun, while condemning the Canton route, had rather made a case for it. From Canton, after traversing Kwangtung, he traversed the province of Kwangsi before entering Yunnan. The province of Kwangsi Mr. Colquhoun described as full of ruined cities, with buildings which proved that the cities along the river were once of very great importance. These, Mr. Colquhoun himself observed, could not have been created by the riches of Kwangsi, for it was a poor province, but they must have been due to the trade of Yunnan. Thirty years ago, before the Taiping rebellion, Kwangsi was one of the great granaries of the south of China, and what made it the base of the Taiping army was that rice was more easily obtained there than in any other province. It seemed to him that if the trade from Yunnan was so considerable as to enable Kwangsi to fill itself with important establishments, the route must also be of equal importance to British trade to Canton, and he had endeavoured to impress that point upon those Chinese who had expressed alarm at the possible introduction of trade by the Si-kong river. That river presented considerable physical difficulties, and in addition there was the difficulty of a double fiscal system, as the French would of course collect duties at their ports. He spoke without the smallest jealousy in this matter, for after spending more than forty years in China he had come to the conclusion that there was room there for all; and supposing the French did make that a great trade-route, it would be for the south-eastern section of Yunnan and nothing else. That

section was, in Mr. Colquhoun's opinion, but a poor country, and his testimony was corroborated by that of Baron Richthofen. Mr. Colquhoun had discovered the south-western part of Yunnan and represented it as a very fertile country, where mixed races were likely to become consumers of British manufactures. He (Sir T. Wade) was not so very sanguine as to suppose that it would immediately become a great area of consumption; but when making some such observation before, he had been corrected by the remark that further south, in a country where from the nature of the climate and the habits of the people a very small consumption of manufactures might have been expected, the amount imported had increased in the most remarkable degree ever since Europeans had access to that part of the coast; and there could be no doubt that further north, among the tribes more or less independent and friendly, a still better market would be found. When once they were across the borders of Yunnan he had no doubt whatever that they would find increasing markets. Englishmen were to be congratulated on having found a new route, though they had not yet got the railways made, which they would be able to use without attracting the jealousy either of the French or the Chinese. He joined with Colonel Yule in the hope that Mr. Colquhoun would be enabled to continue his explorations without in any way suffering in respect to his official advancement.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—October 20th: M. HENRY DUYEYRIER in the Chair.—The Chairman, in reopening the meetings of the Society after the vacation, alluded to the losses they had sustained since they last met; especially in the deaths of Admiral Pothuau, the former Minister of Marine and the Colonies, and M. Leon Poirier, who had bequeathed a sum of money to the Society, the interest of which every three years is to be awarded to one or more French travellers who may have rendered by their explorations good service to science and commerce. The sum is expected to be about 12,000*fr.*; but awards of interest are not to exceed in any one case 60*fr.*—Numerous communications were next disposed of, which had accumulated during the vacation.—It was announced that M. Dutreuil de Rhins had sent a paper on the border-lands of Tibet, Burma, Assam, and China, compiled from letters that he has received in 1882 from Abbé Desgodins. The paper will be published in the quarterly *Bulletin*.—A letter was read from Dr. Defournoux at Kairwan; the writer had visited Morocco, Figuig, South Oran, and was preparing for a journey to Timbuctu. The Sherif of the great mosque at Kairwan had placed in his hands manuscripts of great value bearing upon the historical geography of North Africa.—Communications were also read:—from Dr. Zeballos, relative to Dr. Crevaux; from M. Deloncle at Bangkok, describing an excursion which he had made to the isthmus of Kraw, in company with Dr. Harmand; from M. Soleillet at Obok (1st August), stating that a caravan from Haussa had recently arrived there by a route unknown to Europeans, via Shoa, and that Sultan Hamed Loita had just ceded the port and harbour of Sagalla, in the Gulf of Tadjurra, to the Obok territory; from M. de Lépinay, communicating one of the last letters written by Colonel Flatters, and also a letter from Captain Bernard, respecting his map of the regions of the Sahara.—The sitting concluded with the reading of a paper by M. Ch. Wiener (Vice-Consul at Guayaquil) on his explorations in South America in 1880 and 1881. His travels included a journey from Guayaquil to Pará, and a reconnaissance survey of ten tributaries of the Upper Amazona.

— November 3rd, 1882: M. H. DUVEYRIER in the Chair.—The Chairman expressed his gratification at the safe return from Cairo of the correspondent of *Le Temps*, M. Dutreuil de Rhins, who fell into the hands of Arabi's soldiers, and owed his liberty, and possibly his life, to the arrival of the English. While imprisoned in Egypt he had heard of the tragic end of Captain Gill and his companions. M. de Rhins had been commissioned two years ago to report on the travels of Captain Gill, to whom the Society had awarded its gold medal. He spoke of him as one of the boldest scientific explorers of Asia, and he hoped that the Society would join with him in sincerely deploring his loss. The President stated that the Society would convey the expression of its regret to the Royal Geographical Society with reference to this painful event.—In the room was exhibited the 'Carte hypsométrique de la Turquie d'Asie,' on a scale of 1 : 2,100,000, drawn and recently published by the Topographical Section of the Staff of the Caucasian Army, under the direction of General Stebnitzky. This map, presented by Colonel Venukoff, is constructed on a basis of 2000 hypsometrical observations by travellers in Asia Minor, Armenia, and Syria; as well as the surveys of European engineers in the service of Turkey. This publication will necessitate the correction of most of our existing maps of the Ottoman Empire, as it gives for the first time an exact idea of the general elevation of the country, and the conterminous parts of Persia and the Caucasus.—The Governor of Cochin China had sent news of several explorers. Lieutenant Gautier, whose interesting letters were lately read before the Society, had started for Tracona, on the frontier of Binh-Thuan, where he intends permanently to establish himself, in a region almost unknown. Lieutenant Prudhomme had set out for Sambor, on the upper Mekong, to survey the route for a railway, clear of the flood, and to determine the height of the river banks, above and below the rapids. Between Phnom Lenh and Battambang the erection of telegraph posts is finished; the wires are placed in the Cambodian section, the placing of those in Siam only remaining to complete the work.—At the last meeting mention had been made of the journey, to the isthmus of Kraw, of M. F. Deloncle and Dr. Harmand (French consul at Bangkok). Dr. Harmand had sent to the Foreign Office a report, a portion of which had been transmitted to the Society. The extract referred chiefly to Tchoumphon Bay. He says the river of this name is quite distinct from the Thoungh-Kha, which reaches the sea by another mouth, probably in Sawy (?) Bay. The village of Kraw is very pleasantly situated on the flank of the hills at the confluence of a river, called by the natives Tchan, and the estuary, improperly named Pack-Tchan by Europeans. Dr. Harmand's note is to be published in the *Compte Rendu*.—M. Daubrée, of the Institute, Director of the School of Mines, presented a proof of the first sheet which has just been engraved of the Geological Map of Europe, the publication of which was decided on by the second International Geological Congress held at Bologna in 1881. The Congress had entrusted the execution of this map to an international commission, consisting of M. Daubrée, for France; Mr. Topley, for Great Britain; Maeller, for Russia, &c. The map includes the basin of the Mediterranean, and is on the scale of 1 : 1,500,000. It will be divided into 49 sheets.—M. Ch. Rabot, returning from a voyage to Spitzbergen, wrote from Copenhagen with reference to the severity of the weather and bad state of the ice this year, and stated that all the polar expeditions had been baffled. This was confirmed by Lieutenant R. Roy, who has transmitted a series of notes on the various expeditions, and promises to send a periodical bulletin on the polar regions from documents drawn up in Sweden, Norway, and Denmark.—M. J. Dupuis, the explorer of Tong-king, had written to the effect that the government of Annam has failed to carry out the treaty of 1875; that the Chinese bandits established on the upper part of the Red River, and who set a ransom on all passing

vessels, are in the pay of the King Tu-Duc, and that there is but one course to take, and that is to occupy the Red River, and establish the French protectorate in Tong-king, in accordance with the desire expressed in 1880 by the Société des Études Maritimes et Coloniales.—The meeting terminated with the reading, by M. Bonvalot, of an account of his travels in Central Asia, in company with M. Capus.

—November 17th, 1882: Mr. DUVEYRIER, President, in the Chair.—The Chairman announced that the second General Meeting for 1882 would take place on the 19th December, in the large hall of the Sorbonne, where, as usual, the "Secrétaire Général" would deliver his report on the progress of geographical science during the year. After this Mr. Désiré Charnay would speak of his travels and archaeological discoveries in Yucatan. The banquet which usually follows this meeting will take place on the 18th, this date being the sixty-first anniversary of the foundation of the Society.—M. Ferdinand de Lesseps then said that he also had an anniversary to announce—to-day, the 17th November, being the anniversary of the opening of the Suez Canal. He then entered into some details on the enterprise itself. There were days when as many as 116 ships passed through the Canal. M. de Lesseps said that in the beginning the passage amounted to 3,000,000 tons, at present it is 6,000,000, and probably this amount will be doubled; he congratulated himself on the re-establishment of good feeling with England. Passing to the Panama Canal, he explained at which part the works had begun, and mentioned the construction of a large hospital, inaugurated by a ceremony in which the Bishop of Panama gave an address and M. de Lesseps a lecture. The date of 1888 remains fixed for the completion of this enterprise. He invited those who had assisted him in the work to the opening ceremony, at which he also hopes to be present, notwithstanding his seventy-seven years of age, which will be completed in three days.—The Minister of War presented the last five sheets of the map of Tunis, on the scale of 1:200,000 (preliminary edition) as well as the general map of Algeria, on the scale of 1:800,000 in four coloured sheets.—Mr. D. Langlois, Member of the Geographical Society of Oran, presented his Physical, Judiciary, and Industrial map of Algeria, about which there have been already questions, and of which he has given detailed explanations. The President praised this work, adding that it would be of great service to the Algerian Government.—M. Cheysson, Director of the Department of Maps and Plans to the Minister of Public Works, offered the fourth annual of his 'Album de Statistique Graphique,' published by this Department. This volume contains twenty-three maps.—Mr. G. Marguin wrote from Buenos-Ayres, 10th November, on the subject of the Argentine Expedition, sent by orders of M. Fontana to search for the remains of Dr. Crevaux and his companions, but which returned without result. The expedition had orders not to go beyond the 22nd degree of S. lat.—M. Terry sent a plan of the town of Berryan, which was annexed a few days ago to the Algerian territory. It was announced that another annexation had been made, viz. that of Mزاب, the arsenal where the Touaregs supplied themselves with arms and powder. A despatch received and read at the end of the meeting confirmed this last annexation, and mentioned the occupation of Insalah and the punishment of the assassins of Colonel Flatters' mission.—The Abbé Lesserteur, Director of Missions, replied to a paper on Tong-king, communicated at the last meeting by M. Dupuis, the explorer of the "Fleuve Rouge" (Songka river). The speaker especially justified the conduct of the French missionaries in that part of Indo-China. M. de Quatrefages read a letter from Saïgon, from which it appeared that Lieutenant Gautier was at Bam-Tinh strengthening the relations with the chief of a neighbouring tribe, the so-called King of the Mois, who exercised great influence.—Two letters were read from Lieutenant Hoygaard, of the Danish Navy, commanding the *Dijmphna*, the last dated from the Kara Sea, 22nd September. On the 15th he had succeeded in passing Mestni Island, and steered

eastward, but during the night he fell in with the *Varna* and the *Louise*, carrying members of the Dutch Expedition; both ships were surrounded by ice. Without the delay occasioned by the attempt to assist these vessels, Lieutenant Hovgaard was convinced that he would have reached the Yenisei river by that date, but was himself detained by the ice; he hoped to be soon liberated by the equinoctial gales and to have before him a month of navigation. However, added he, the expedition is out of danger, but he could not act otherwise than help the ships, which appeared in distress, as they had fired guns.—M. Charles Rabot gave some information of his voyage last summer in Lapland and Spitzbergen. The "Svartisen" glacier, on the north coast of Norway, has been surveyed by him, but the glacier is not, as was supposed, the largest in Europe, having, on the contrary, rather small dimensions. Several large valleys, of which M. Rabot knew the existence in these latitudes, are not marked in the maps. In company with an English gentleman, Mr. A. Henneage Cocks, M. Rabot visited Spitzbergen. The sea being quite open to the west, the travellers explored some important fiords along that coast and brought back some photographs of great geological interest. The meeting ended with a communication from M. Paul Lévy, mining engineer, who makes the prospecting for gold in Central America his chief occupation, and described picturesquely the five republics which occupy the centre of this large part of the world.

Geographical Society of St. Petersburg.—October 11th, 1882: M. P. SEMENOV, Vice-President, in the Chair.—The Chairman opened the proceedings by alluding to the mournful event of the death of Count Lütke, who was one of the founders of the Society, and for thirty-two years took an active part in all its proceedings.—He then introduced to the meeting M. Miklukho-Maclay, who had recently returned to St. Petersburg after twelve years' absence. In 1870 this accomplished traveller undertook, on his own account, a most adventurous journey with a view to the study of savage tribes in the lowest stage of development. He sailed in a Russian ship to New Guinea, landed at a place that was never visited before by Europeans, erected a hut, and stayed there for fifteen months. Thence he proceeded to Batavia, in Java, where he published the scientific results of his residence among the Papuans, soon after which he started on a new journey; he visited again New Guinea, as well as several groups of islands of the Melanesian Archipelago, and afterwards made a longer stay, first on the peninsula of Malacca, and then at Sydney in New South Wales. The Imperial Geographical Society was able to support M. Miklukho-Maclay by pecuniary means only to a small amount. But the Russian public came to his aid by means of public subscriptions organised by the press, and enabled him to continue his researches. Fears were entertained at one time with regard to the health of the traveller, but he had happily returned to Europe, and would soon publish the valuable materials he had collected.—M. Miklukho-Maclay then gave an account of his first sojourn in New Guinea. He said he landed on the north-eastern coast of the island, in the neighbourhood of Astrolabe Bay, so named by the celebrated French voyager Dumont D'Urville. M. Maclay erected a hut between the two villages Gorendou and Humbou, at a place called Garagasi. He gave a graphic description of the difficulties he had to struggle with in overcoming the distrust of the Papuans towards a white man who had thus strangely settled among them. They tried hard to induce him to go back whence he came, but by means of much patience and self-control he succeeded, after a few months, in conquering the distrust he inspired. He learned the language of the Papuans, and became their friend. Taking advantage of the supernatural origin they ascribed to him (they used to call him the Man from the Moon) he succeeded in putting an end to the continuous wars which had broken up many villages and tribes. The scientific results of his expedition he published (in German and in French) in the Journal of the Batavian Society of Natural Science ('Natuurkundig

Tijdschrift voor Nederlandsch Indie') under the following titles:—1. Anthropologische Bemerkungen über die Papuas der Maclay-Küste in Neu-Guinea; 2. Ueber Brachycephalie bei den Papuas von Neu-Guinea; 3. Ethnologische Bemerkungen über die Papuas der Maclay-Küste; and 4. Notice météorologique concernant la Côte Maclay en Nouvelle Guinée. Another paper of his (in French), on the vestiges of art among the Papuans, appeared in the 'Bulletin de la Société d'Anthropologie de Paris,' 1878, 3e série, tome i. The third of the above-mentioned papers (Ethnologische Bemerkungen) contains a complete description of the food, kitchen-implements, dress, habitations, daily life, art, superstitions, and music of the Papuans. A great part of the collection he had made on the north-eastern coast of New Guinea, containing quantities of implements, weapons, &c. of Papuans, as well as a large craniological collection, remained in Sydney.—M. Miklukho-Maclay found very soon that in order to complete his studies on the Papuans he ought to make acquaintance with the race inhabiting other parts of New Guinea, as well as the inhabitants of other parts of the Melanesian Archipelago; and further, that he ought to ascertain their relationship with the so-called Negritos of the Philippine Islands, and to visit the Malay Peninsula, in order to ascertain if representatives of the curly-haired race were found there. Accordingly, in 1876, he returned, on board a small English schooner, the *Sea-bird*, to New Guinea. He went first to Celebes, then to Geby, Pegan, and Yap islands; he visited also the Pelew Archipelago and the Admiralty Islands before reaching New Guinea. An account of this journey was published in the *Izvestia* of the Russian Geographical Society for 1880 and 1881, and in 'Petermann's Mittheilungen' for 1879. On his second visit to New Guinea M. Maclay was provided with far larger means than in 1871. He devoted special attention on this visit to anthropology, and returned with a portfolio well filled with most interesting anatomical sketches. In the concluding remarks of his address M. Maclay described the very low stage of civilisation of the Papuans, who were ignorant before his arrival of the use of metals, and of the manner of obtaining fire (they maintain it in their huts, and if extinguished bring it from a neighbour or from a neighbouring village). He also gave interesting details regarding their burial customs, and the friendship that was established between himself and the natives; he gave them the advice, when leaving, to abstain from "kidnapping," which is practised to a great extent on the Solomon, New Hebrides, and other islands of Melanesia.

— October 16th: M. P. SEMENOF, Vice-President, in the Chair.—Owing to the very great number of persons who wished to hear the second address of M. Miklukho-Maclay, the Society held its meeting in the lecture hall of the St. Petersburg municipality, at the Solanvy Gorodok.—In his second lecture M. Miklukho-Maclay gave further particulars about the Papuans of the "Maclay coast," who are pure representatives of the Melanesian or Papuan race; he proved by his numerous measurements that the distinction which was established by anthropologists between the Papuans of the sea-coast and those of the interior does not exist in reality. Neither the supposed dolichocephalism of the Papuans and the brachycephalism of Negritos, nor the supposed difference of the diameters of the curls of the hair justify this distinction. In December 1873, M. Miklukho-Maclay undertook a third journey to New Guinea, namely, to the coast Papua-Koviay, the inhabitants of which have a bad reputation as robbers and cannibals. After having landed on the Kilvara island of the Seram-hamut group, he took a Malayan boat and a crew of sixteen Malays and Papuans, and reached the Papua-Koviay coast, where he found also pure representatives of the Papuan race. During his boat-journey he visited Triton Bay, where the Dutch had in 1828 to 1836 a military colony, and discovered several errors in our maps of this part of New Guinea. Thus, Triton Bay proved to be not a bay but a very fine strait, which M. Miklukho-Maclay named after the

Grand Duchess Hélène Paulovna. Another sound, named after Queen Sophie of the Netherlands, separates Namatote island from the mainland. After having left ten men of his crew at Aiva—a promontory between these two straits—M. Miklukho-Maclay undertook a journey into the interior of New Guinea. He landed on the mainland opposite Coira island and advanced into the interior, crossing a chain of mountains 1200 feet high, and discovering a narrow lake called Kamaka-vallar; this lake has no outlet, and is therefore subject to periodical risings after heavy rains, its water then finding a temporary outlet, and its level falling at once 15 to 20 feet. In Kiruru bay the boat of the adventurous traveller was attacked by natives, but managed to escape; whilst his men at Aiva were plundered by Papuan highlanders, who killed the interpreter with his wife and child. Proceeding with a few men to the camp of the robbers, M. Miklukho arrested their chief without any resistance on the part of the Papuans, who were terrified by his boldness. The Papuans of the Koviay coast are far worse off than those of the western coast. The Malays resorting here to make purchases of slaves, the inhabitants of the coast have undertaken to provide them with slaves by means of raids in the highlands; the highlanders, too, make continuous raids on the villages of the coast, and therefore the inhabitants of this last have been compelled to leave their huts and to become aquatic nomads. They live in covered boats and land only for the night, or during bad weather, at a few places along the coast where they are in security from attacks. They have, of course, very great difficulties to provide themselves with food. After his return to Java, M. Miklukho-Maclay soon prepared for a fourth visit to New Guinea, namely, to the south coast, to study the so-called yellow Malayan race. He discovered here but a few villages, the inhabitants of which are a mixed race of Papuans with Polynesians, and have therefore a lighter coloured skin and uncured hair, the remainder belonging to the same race of Papuans as elsewhere in New Guinea. A fifth, but very short, visit was made by M. Maclay to the same coast in 1881, on board an Australian man-of-war. M. Maclay concluded his lecture with a few remarks on the good influence exercised on Papuans by the staff of native Polynesian missionaries of the London Missionary Society, but observed also that this is completely counterbalanced by the very bad influence exercised on natives by the traders who go where missionaries go, and import spirits, diseases, and implements of war, together with their own vices.—After the delivery of the address the Chairman announced that the Geographical Society would do all in its power to publish, with the aid of Government and of the Russian public at large, the full results of M. Miklukho-Maclay's travels.

—October 18th: M. SEMENOF, Vice-President, in the Chair. The meeting took place again in the lecture hall of the Solanvy Gorodok, for the delivery of the third address of M. Miklukho-Maclay.—The traveller gave an account of his journey to the Philippine Islands and in the interior of the peninsula of Malacca, where he spent some time in the study of the so-called "Orang-outang men," or Forest Papuans. He then went to Sydney where he met with the most cordial reception and took a lively part in the opening of a Biological Station. He found great facilities for pursuing anthropological studies in Australia, and made a large collection of measurements and photographs for anthropological purposes. He was enabled also to bring in large collections of photographs of the brains of Chinese, Australian natives, and Malaysians. All photographs were made on quite fresh brains, and each brain is represented in eight different positions and sections.—After each of his three lectures, M. Miklukho-Maclay attended on the following morning in the rooms of the Geographical Society, where his collections of drawings and implements were exhibited, to give explanations of his ethnographical, anthropological, and anatomical drawings. These *conversazioni* had a real scientific value and attracted great numbers of visitors.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Biliotti, Edouard, and Cottret, L'Abbé.—*L' Ile de Rhodes.* Rhodes (published by the Authors) and Compiègne (Cottret): 1881, 8vo., pp. vii. and 722, maps, illustrations [no Index]. (*Dulan*: price 12s.)

Simultaneously published in modern Greek (by Marc Malliaraki, with the authors' help), this work is principally devoted to the history and archaeology of the island, the discussion of the latter subject containing a considerable amount of topographical matter in the comparison and identification of ancient sites.

The intellectual and social status of the inhabitants is separately treated (a little pottery and fishing for sponges being apparently the only industries), also in historical order; and in the concluding section the geology and physical geography of Rhodes are described, with notices of the climate, flora, fauna, fisheries, agriculture, and commerce. A tour of the island is sketched, and some useful general observations are given, from which it appears that living is now much dearer than before.

A rough map (scale 1:200,000, or about 3 miles to the inch), shows churches, forts, ruins, &c., and a reduction of Admiralty Chart No. 1637 is employed for the town and ports of Rhodes. The illustrations are archaeological and heraldic.

Farrer, Richard Ridley.—*A Tour in Greece, 1880.* With twenty-seven illustrations by Lord Windsor. Edinburgh and London (W. Blackwood & Sons): 1882, royal 8vo., pp. 216, map. Price 21s.

The author refers to the decrease of travellers in Greece since the War of Independence, for reasons unnecessary to mention here; and is of opinion that current notions of the country are derived mainly from the capital and its immediate neighbourhood, which give a false idea of the interior. He gives in an appendix instructions as to reaching and seeing Greece. The map is on the scale of 1:917,000 (14·478 miles to the inch), and includes one inset of Corcyra on the same scale, and another of the Cyclades (scale 1:1,834,000). Many of the illustrations represent physical features, which they render effectually.

ASIA.

Joest, Wilhelm.—*Aus Japan nach Deutschland durch Sibirien.* Köln (Du Mont-Schauberg): 1883 [1882], sm. 8vo., pp. 328, map, photographs. (*Dulan*: price 7s.)

The author's journey, by the stock route from the Pacific via the Amur, Baikal, Tomsk, &c. (shown on a small scale map from Stieler's Hand-Atlas), is illustrated by a few typical photographs.

O'Donovan, Edmond.—*The Merv Oasis. Travels and Adventures East of the Caspian during the years 1879-80-81, including five months' residence among the Tekkés of Merv.* London (Smith, Elder & Co.): 1882, 2 vols., 8vo., pp. xx. & 502, xiv. & 500 [no Index], maps, plans, portrait, and facsimiles. Price 36s.

The lecture by Mr. O'Donovan (Special Correspondent of *The Daily News*) read before the Society's evening meeting of March 27th last, and appearing in the June number of this year's 'Proceedings,' represents only the chief features of that gentleman's ride to Merv and of his confinement in Koushid Khan Kala, the fortified position on the Murghab which now represents that ancient city. The further details of this, the most important part of Mr. O'Donovan's Trans-Caspian adventures, occupy from p. 89 to the end of his second volume above referred to, and comprise information of the most

varied kind bearing on the Turkomans and their stronghold, illustrating their tribal relationship, manners and customs, political opinions, and commercial relations, and the history, hydrography (natural and artificial), general geography, products, and capabilities of the region. This portion is illustrated by a general map of the Merv district and its water-courses, showing the positions of the various Tekké subdivisions with their villages from actual survey on the ground (scale $7\frac{1}{2}$ miles to the inch); also by a plan of the dam on the Murghab showing the Alasha and Novur Canals (160 yards to the inch), and a ground plan of the old cities of Merv (340 yards to the inch).

The first volume and the earlier part of the second contain the account of Mr. O'Donovan's wanderings in the Russian Trans-Caspian territory, and in Persia and its north-eastern borderland. Starting from Trebizond early in February 1879, he reached Baku by Batum, Poti, and Tiflis, and visited the naphtha spring district, of which he gives particulars. Crossing the Caspian to Chikislar, he journeyed north of the Attrek to Chat, at the junction of the Sumbar, finding that the main river, though excellent as a frontier line above Gudri from the depth and steepness of its ravine, is too undefined for that purpose from that point to its delta mouth. His observations on the hydrological peculiarities of this river and the Gurgan, and generally on the shores and plains east of the Caspian, are very interesting. In spite of the received belief that the bed of the Oxus has been shifted from the Caspian to the Sea of Aral by human agency, he is inclined to the opinion that the gradual elevation of the Caspian littoral by volcanic action has had more to do with the change. At p. 218, will be found an excellent description of the violent and abrupt storms from the westward called "tenkis," which sometimes force the waters of the Caspian up the Gurgan, damming its natural flow and causing inundations. The destruction of vast quantities of fish by one of these sudden floods and subsidences was witnessed by the traveller.

Returning to Chikislar, Mr. O'Donovan sailed up the Caspian to Krasnovodsk, visiting the desolate Kara-Bog haz sulphur district; and after crossing back to Baku and some further investigations of the Chikislar region, was compelled on the death of General Lazareff to leave the Russian territory, and so struck south to Astrabad. Various excursions were made from that city (especially to Gumush Tepé on the coast, of which he gives a plan), and much information obtained with reference to the relations between the Persians and Turkomans, the fauna of the district, &c.

Mr. O'Donovan finally journeyed across the southern end of the Caspian to Anzali, thence working through Persia by Teheran, Shahrud, Sabsawar, Kuchan, and Meshed, partly in company with a pilgrim caravan. From Meshed he made excursions in Derguez and the Attok, visiting Muhammedabad (where he met Colonel Stewart in disguise), Askabad, Lutfabad, Kelat-i-Nadri, and other little-known spots on the frontier, and collecting a great amount of material for a correct understanding of this region and its unsettled population, at the present time so interesting to English readers. At Kaka, some 20 miles south-east of Lutfabad, he succeeded in evading the Russian agent who was endeavouring to prevent his journey to Merv, and started on his successful ride across the Tejend and southern Kara Kum to the Merv oasis.

A large separate map (scale 24 miles to the inch) shows the whole area discussed by the work, based on that accompanying Colonel Stewart's report, with corrections by the author and the addition of his own surveys eastward of the point in the Attok (near Abiverd), where that officer's travels ended.

Schefer, Ch.—*Le Voyage de la Sainte Cyté de Hierusalem, avec la description des Lieux, Portz, Villes, Citez et aultres Passaiges fait l'an mil quatre cens quatre vingtz, estant le siege du grant Turc à Rhodes et regnant en France, Loys unziesme de ce nom.* Paris (Ernest Leroux): 1882, royal 8vo., pp. lxxvii. & 153. (*Williams & Norgate*: price 13s. 6d.)

Forms vol. ii. of the 'Recueil' mentioned *infra*, under CABOT (America). The account of the pilgrimage reproduced and annotated in the above volume was first published at Paris in 1517 by Regnault; both this and the two subsequent editions appear to be of excessive rarity.

Seebohm, Henry.—Siberia in Asia: a visit to the valley of the East Yenesei in Siberia, with description of the Natural History, Migration of Birds, &c. London (Murray): 1882, sq. 8vo., pp. 340, map, illustrations. Price 14s.

A pendant to the author's (so-called) 'Siberia in Europe,' describing the natural history (and especially the ornithological) aspects of the country traversed with Captain Wiggins in 1877, of which the geographical features were discussed by the author in our Journal, vol. xlviii. pp. 1-16.

Véreschaguine [M. et Mme.]—Esquisses de Voyage dans les Indes. 1^{re} partie. L'Hymala Oriental. Paris (Librairie Illustrée): 1882, sm. 8vo., pp. 116, illustrations. (Dulau: price 2s. 6d.)

Only to be mentioned here on account of the excellence of the drawings.

AMERICA.

Cabot, J. and S.—Jean et Sébastien Cabot. Leur Origine et leurs Voyages. Étude d'Histoire Critique, suivie d'une Cartographie, d'une Bibliographie, et d'une Chronologie des Voyages au Nord-Ouest de 1497 à 1550, d'après des Documents inédits. Par Henry Harrisse. Paris (Ernest Leroux): 1882, royal 8vo., pp. 400, map. (Williams and Norgate: price 21s.)

Forms vol. i. of the "Recueil de Voyages et de Documents pour servir à l'Histoire de la Géographie depuis le xiii^e jusqu'à la fin du xvi^e Siècle," published under the direction of MM. Ch. Schefer and Henri Cordier.

The map is a fac-simile of one by Sebastian Cabot, dated 1543, unique, in the Paris National Library.

Falb, Rudolf.—Das Land der Inca in seiner Bedeutung für die Urgeschichte der Sprache und Schrift. Leipzig (J. J. Weber): 1883 [1882], 8vo., pp. xxxvi. and 455 [no Index.] (Grevel: price 17s. 6d.)

The author (known in America for his seismological predictions), after a brief outline of his travels in the southern continent, gives an elaborate comparative analysis of his views as to the value of early Peruvian symbolic and other languages in the history of primitive speech and writing.

Guatemala.—Primer Censo Jeneral de la Republica de Guatemala, levantado en el Año de 1880, bajo los auspicios del Gobierno del Benemérito Jeneral Don J. Rufino Barrios. Publicacion oficial de la Secretaria de Fomento, Seccion de Estadística. Guatemala (Establecimiento tipografico de "El Progreso"): [1881] 4to., pp. xxiv., A-H, & 448.

The Society has received from Señor Salv. Valenzuela, head of the Statistical Section of the Guatemalan Home Secretariat, a copy of the first census of the Republic, taken in 1880. Besides the purely statistical returns, a brief general geographical and descriptive account is given of each of the departments separately discussed, viz. Guatemala, Amatitlan, Escuintla, Sacatepequez, Chimaltenango, Baja-Verapaz, Alta-Verapaz, Peten, Chiquimula, Izabal, Zacapa, Jalapa, Jutiapa, Sta. Rosa, Quezaltenango, San Marcos, Suchitepequez, Retalhuleu, Solola, and Totonicapam with Quiché and Huehuetenango. The general results do not appear in the copy received, but the whole population is 1,209,678, by adding together those of the separate departments,—Guatemala being the highest with 129,314 (Totonicapam being only calculated, not actually counted, at 147,935).

Symons, [Lieut.] Thomas W.—Report of an examination of the Upper Columbia River and the Territory in its vicinity in September and October 1881, to determine its navigability and adaptability to steamboat transportation. Made by direction of the Commanding General of the Department of the Columbia, by Lieut. Thomas W. Symons, Corps of Engineers, U.S. Army, Chief Engineer of the Department of

the Columbia. Washington (Government Printing Office): 1882, 4to., pp. 133, maps, illustrations [Senate: 47th Congress, 1st Session, Ex. Doc. No. 186].

In addition to the results of his own survey, Lieut. Symons has utilised the trustworthy reports and writings of others bearing on the Upper Columbia and the country drained by it and its tributaries, with the chief object of demonstrating the economical importance of the river; he also adds an historical and geological account of it, giving a clear idea of the fertile and extensive Great Plain composing the northern portion of its interior basin. His own observations are recorded in sections describing the river above Grand Rapids, and thence to the Spokane river, Lake Chelan, and the Snake river, followed by a table of distances; and in the discussion of the various physical obstacles he gives a summary (p. 65) of the improvements advocated to afford continuous navigation from Grand Rapids to the mouth of the river. A chapter on the geographical nomenclature of the region concludes this interesting Report, which is illustrated by a map of the Upper Columbia from the international boundary to Snake river (scale 1 inch to 2 miles), in 25 sheets with an Index sheet, from the author's surveys. Various drawings and maps of rocks, falls, and rapids, are also given in the text.

AUSTRALIA.

Lord Howe Island.—Report on the present state and future prospects of Lord Howe Island. By the Honourable J. Bowie Wilson. Published by authority. Sydney (Thomas Richards, Government Printer): 1882, 4to., pp. 40, map, photographs.

Consists of Historical Notes; the Commissioner's Report as in title; a Report on the Geology of the Island, by Mr. H. Wilkinson, of the Department of Mines; Report by Mr. Conder, Superintendent of Trigonometrical Survey; Report on the vegetation of the island, by Mr. J. Duff of the Botanic Gardens, Sydney (including a few temperature observations); and a brief report to the Trustees of the Australian Museum by Mr. A. Morton on the fauna.

The chief feature of this unusually complete Report is in the photographic illustrations which give an excellent idea of the physical geography and somewhat peculiar vegetation of the island, and are of intrinsic pictorial value. The tree ferns formerly abundant are now nearly extinct, and it is suggested that their removal should be prohibited; the present expedition has, however, added a new species of *Hemitelia* to the known flora of the island, as well as a new *Aspidium* and *Pandanus*. The mean latitude has been corrected to $31^{\circ} 33' 4''$ (the longitude east of Sydney observatory being $0^{\circ} 31' 28'' 20''$). Only slight traces of minerals were found; and it is strongly urged that the island should be reserved as an Australian sanatorium.

The map is geological (scale 1:24,248), giving also reefs and soundings.

GENERAL.

Ritter's Geographisch-statistisches Lexikon, über die Erdtheile, Länder, Meere, Buchten, Häfen, Seen, Flüsse, Inseln, Gebirge, Staaten, Städte, Flecken, Dörfer, Weiler, Bäder, Bergwerke, Kanäle, Eisenbahnen, etc. Siebente . . . Auflage. Unter der Redaction von Dr. Heinrich Lagai. Leipzig (Otto Wigand): 1882, 8vo. (Dulau & Co.)

This seventh edition of Ritter's standard Gazetteer, under the care of Dr. Lagai, is stated to be thoroughly worked up to date, increased and improved; it is to be completed in about 33 parts (making two volumes), at 1s. each part, appearing every three or four weeks, or at a less interval. The first part, of 64 pages, includes to St. Anne, being 12 pages longer than in the last edition (1874, edited by Dr. Otto Henne-Am Rhyn).

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Apsheron Peninsula.—Map of the,—(on the western shores of the Caspian Sea); showing Petroleum Wells, Oil Refineries, Pipe Lines, &c. By St. Goolishambarow, Eng. Tiflis, 1882. Scale 1 : 84,000 or 1·1 geographical miles to an inch. Price 10s. (*Williams & Norgate.*)

Balkan-Halbinsel, Geologische Übersichtskarte der.—Von Franz-Toula. Scale 1 : 2,500,000 or 34·4 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1882, Tafel 16. Justus Perthes, Gotha. (*Dulau.*)

Bayberger, F.—Die Moränenzüge des Inn-Gletschers von Kufstein bis Haag. Von F. Bayberger. Red. v. B. Hassenstein. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 70. Justus Perthes, Gotha, 1882. (*Dulau.*)

Besançon, Scale 1 : 20,000 or 3·6 inches to a geographical mile. Dépôt de la Guerre, Paris. 9 sheets. Price 5s. (*Dulau.*)

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